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### TOP OF THE MONTH



F3R. Well, RCA did it. They got the bird into orbit, and into operation. In record time. Less than 6 weeks went by between the launch, and the full scale turn-on December 28th.

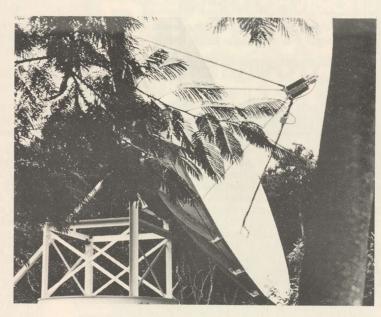
CSD looks at the first reports trickling in; they are mostly good, with a few pointed exceptions, in this issue. We'll have an indepth analysis for you in March. There is no time to catch our breath however; SAT-COM F4 was due to launch January 14th and if RCA needs 6 weeks to turn this one on, we'll be looking at pictures before you read the March issue. Then before you can draw an additional breath, WESTAR 4 is scheduled to lift off on February 25th. They are shooting for a late April turn on date. It will be a busy spring!

Then this fall we can look to the launches of 12 GHz ANIK D1 (August 12th) followed by 24 transponder WESTAR 5 on September 30th and RCA's SATCOM 5 on November 18th.

1982. It's a big one and we'll sort it out in Fort Worth March 26-27-28!

### FEBRUARY 1982-

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COOP'S SATELLIT DIGEST

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# COOP'S SATELLITE COMMENT

- MOVING TO FLORIDA
- WE NEED "CHEAP" UPLINKS

### MOVING

This will be the last issue of CSD .... to be printed and published from Oklahoma. No big deal, but since the CSD readership family is sort of a part of our family, I wanted you to know about it, and what it means.

CSD started because, after the first SPTS, it was clear that we needed some sort of clearing house for the fast developing home TVRO industry. There were just under 400 prepublication "pioneer" subscribers. Many are still with us. Even before the first issue of CSD was on the presses, Susan, Tasha, Kevin and I were headed for the Turks and Caicos Islands. We had planned that years before and magazine or no magazine, we were going. As those who have been with us for the full 28 issues can attest, coordinating a timely, monthly magazine from an off-shore location has had its problems. But overall it has worked out very well, because we've had Rick Schneringer in Oklahoma to keep the information flow going; both ways.

Since last May Rick and Gloria Schneringer have owned STT, the company Susan and I founded to kick off the home TVRO revolution. CSD has continued to be handled, mechanically, by STTI(I) but we have been looking for a way to cut down on my monthly trips to Oklahoma. It takes more than a day to get there and more than a day to get back. It is, to say the least, a very tiring experience frought with missed air-



COOP doing magazine paste-up in a Fort Lauderdale Holiday Inn hotel room. We leave wax all over their mirrors and tables!

plane connections and a myriad of common travel ills.

We have been flying back and forth from Provo to Fort Lauderdale with one of the last, great, "bush pilots" in the world; a chap named Ed Hegner. Hegner has been hauling people and freight into and out of the western Turks and Caicos islands for more than 15 years; he came here when they had to land on a sometimes dry, sometimes wet "salt flat" in the center of the island. He's a whiz with old Beech D-18 craft, and his business the past year has finally taken off. After 15 years of hauling chickens and tires and hot, dusty, sweating people into and out of Provo, Hegner is an "overnight success". He now owns six of the D-18 type craft, employs several pilots, and of extreme importance to us, opened a fulltime office at the Fort Lauderdale Executive Airport late in 1981. We talked Ed into allowing us to share that facility, and with that "connection" we now had a place to move CSD

The March issue will be printed in Florida, by a new printer. We send copy back and forth between Provo and Fort Lauderdale several times per week now and Beth, our new office manager at (305)771-0505 is coming up to speed on handling advertising, subscriptions, and the tons of letters we receive each month. Susan and I, or I, will now fly into Fort Lauderdale around the middle of each month to do the final magazine paste up. Ed's D-18 Beech planes will soon be supplemented by a new turbo-prop job, so the 3.5 to 4 hour flight may well be under 3 hours shortly. Life is improving on the frontier!

Outwardly, other than the slight format change you will see in this issue (planned six months ago), and the new look attendent with a new printer, you should see very little other indication of the move. Rick Schneringer and I will still handle the chores of the SBOC (etc.) gatherings jointly; manuals, et al will continue to be available exclusively through STTI.

Oh yes, look for an announcement in this issue about a 24 issue reprint of the first two years of CSD. We finally knew when to say uncle!

### **GROWTH FROM WITHOUT**

One day not long ago the Peruvian Ambassador to the United States stopped in to see us at WIV here in the Turks and Caicos Islands. He came to learn about low power television re-broadcasting, and, satellite reception using relatively low-cost equipment. His nation is exploring what such technology might do for their far-scattered population.

This is a very articulate, extremely well educated man. With his California born wife, they are people "of the world" who consider all of the world their home. They are not sheltered people; yet they realize, wisely, that most of the world does lead a very sheltered existence.

When he walked into the control room door, after inspecting the trio of satellite dishes along the south side of the Annex building, he was asking me to update him on the latest reports on two of the "that-day" world shaking news stories. He just finished asking the question when we walked into the

control room. Over his shoulder I saw the start of the ABC "Good Morning America" west coast feed on a monitor. I flipped up a monitor speaker switch, and in two minutes time we had the answers to his question.

"I am more convinced than ever" he said "that I have just witnessed the most important technological advance in the history of man". He was referring to the instantaneous nature of satellite communications. After we flipped through the sixty plus channels of television, and talked some more, he came to his big question.

"Which company, in this industry, can help us with the planning of both the transmitting end, and the receiving end, of a national satellite system?".

My mind instantly jumped over all of the **home** TVRO firms, since nobody in **our** industry has transmit capability. After swirling the remaining firms through my mind, I settled on MA/COM; the only firm that has both transmit and receive capabilities. I cautioned him, however, that as nice a people as MA/COM are, they are not inexpensive. "There are firms who sell the **receive end** of this hardware who can sell you similar quality products and performance for 60% of MA/COM's price" I added. He understood what I was saying; dealing with a single source for all of a system may be convenient, but it also may not be cost effective.

Very few firms now in this bloody business really do have a handle on what is happening, and how. Getting a broad, overall perspective on the rapidly developing world-wide market for all types of TVRO hardware is no easy task.

One of the primary fallouts, from all of the publicity that has come from the home TVRO explosion in North America, is the realization, common knowledge if you will, worldwide that low-cost terminals do work and work well. It is no longer possible for the SA's of the world to sell \$25,000 up "small terminals" to previously gullible users. People like the Peruvian Ambassador now **know** better; they have savvy staffs, who have explored the field and who pile up magazine articles and synopsis reports for the decision makers to consider.

This is hurting some manufacturers. David Fedric of National Microtech comments that 1,000-lot teleconferencing terminal buys are on the horizon here in the USA; and that firms such as National Microtech may end up walking all over SA and other "traditional suppliers" in this sales race

SA and other "traditional suppliers", in this sales race.

That will delight me. I figure SA had their chance back in 1979, and they blew it. Had they stayed with us, when we needed their support, we probably wouldn't be in the US legislative fix we are now facing. But they bowed out, and as my grandmother used to say, "they made their bed; now they can sleep in it".

I would like to see a company with the SA resources in here, however, playing the game like the rest of the home terminal suppliers, with the **added** product capability of reasonably priced (i.e. low cost) **uplink packages.** The big hang-up seems to be the transmitter itself; they are produced in very small numbers, annually, and that contributes to their big dollar costs. There is a fresh challenge, and a waiting world market, for the people or firm who sit down and figure out how to bring uplink costs down to the relative low-costs we have attained with the downlink terminal packages. Somebody with talent and guts is going to make mega-bucks on this one. I hope it happens soon; we need it!

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# COOP'S SATELLITE DIGEST-

# SAGA IN THE BAHAMAS

I gripped the edge of the freshly-installed Paraframe ET/ 6.00 "Caribbean Conqueror" and pulled. The 2000 pound combined moving mass of antenna and mount rotated smoothly and evenly. F1's signal exploded onto the nearby TV screen. Although he knew I could plainly see the crisp CBN logo, the proud and excited owner could not resist screaming "You've got it!!!"

Our young Haitian helper, towering inches above me, grabbed my hand and shook it vigorously; I wondered if he might yank my arm from the socket. Unable to speak more than a few words of English, he understood the significance of the event none the less, and he was obviously proud to

have played a part.

Owner Sam Jackson watched the Earth Terminal receiver's CNR meter as I nudged the big antenna for peak video; and then having peaked the dish, we crossed our legs and sat down under the wispering palms to watch the WGN Evening

News under a star-filled, tropical sky.

This particular odessy had begun several days earlier; in the last days of October. I was leaving a rain soaked Chicago runway headed for the Bahamas in a huge L-1011 Eastern jet. I should have been excited by the prospect of spending a week in the Bahamas, and out of the early Chicago winter cold; but instead I was apprehensive. I had been to Nassau the previous October to help a former Paraframe dealer install another ET/6.00 on a mount the dealer had fabricated. The mount had been too light and very poorly constructed; the chain drive had come apart early and the balance of the mount had followed shortly thereafter. I was now headed to Nassau to repair and replace, as the case might end up, the now collapsed mount, with our Az-EL mount which is now standard ET/6.00 equipment.

I had been told last April by George Allen of Bahama Electronics that the lightweight mount had given away in a gusty spring storm. Not only had the mount come apart, but

by Jim Vines Paraframe, Inc. P. O. Box 423 Monee, IL 60449

**About The Author-**

Newcomers to the industry may well ask "Jim WHO?" or "Paraframe WHAT?" Jim Vines was here when the industry started. His unique antenna design was the first to be offered to the industry at the first SPTS. Paraframe antennas are big, beefy, and scattered from Alaska to Honduras. Vines has resisted the temptation to cheapen his product, has stayed small, and retained his image of fabricating precision antennas from 3 to 7.4 meters in size. We welcome Jim back to the pages of CSD; his last detailed report on an installation appeared two years ago this month!

the 1400 pound antenna also would require some repair work since when the dealer-supplied lightweight mount went, the antenna came tumbling down.

Winging my way south, and passing over northern Florida, I reviewed the possible on-site problems. One of the laminated parabolic arms might require replacement. If the repair sequence I had worked out came off, it would take four hours to replace the ribs plus perhaps two aluminum panels. That depended on our being able to do the repair work in place, and with being able to repair the damage without having to do a complete antenna tear-down. If the latter turned out to be the case, well...it could take us three full days. Then just to keep life interesting, while I was in Nassau I would also install a brand new 6 meter Caribbean Conqueror for a Bahamas born businessman.

Aletha Jackson was at the airport to drive me into town when I arrived at Nassau. "Sam (Jackson) should have been an engineer or scientist; he's so systematic and inquisitive. For Sam, the enjoyment comes from taking a challenge and meeting it with total competence"

It showed. Sam Jackson couldn't locate an inclinometer to measure elevation angles. So he had crafted a huge wooden protractor. String for the angular "bob" would not do; 12 pound monofilament line was selected, weighted with a surveyor's lead bob. The protractor would later work beautifully, allowing us to set the big dish to a 21 degree elevation and then to find F1 on the first azimuth sweep.

Sam and Winfed had assembled the parabolic framework before I arrived. They had also begun the proofing and adjustment sequence for the dish surface. The framework conformed closely to the proofing template and the rim integrity

was excellent.

Sam's TVRO was a straightforward job, worked on in the evenings. The days were spent at the western edge of the island with Earthstar's Bob Christofanelli at the Josphenson estate. Here the task was the repair of the damaged dish, rebuilding the earlier concrete foundation which would have to be strengthened to support the new Az-EL heavy-duty mount, and replacing the remote cabling lines. Christofanelli had his work cut out for him. The original installation had 800 feet of 24 volt ribbon line to control the LNA rotor. Predictable, the rotor was sluggish or did not work at all since the voltage drop in that much cable was excessive. The original receiver, remoted over that much cable, also did not function properly. At the mount, the original contacts for the motor's drive units and switching units had corroded in the humid Nassau



THE JOSEPHSON TVRO - This ET/6.00 was first installed in the fall of 1980 on a lightweight chain driven polar mount. The mount broke and the dish crashed, with minor dish damage.

climate in one month's time.

Tom Josephson lives in the Bahamas after rising to the top of Canadian business. During WW2 he built the first airfield at Prince George in British Columbia. Then he was an industrialist in Toronto, followed by deep involvement in some of the early real estate developments in the Fort Lauderdale area. It was hard to miss his success, as I talked with his son Donny while fashioning a 6 meter parabolic template in a garage building on a rainy afternoon. We had to step around and stay clear of the Rolls Royce parked nearby. I wanted to orchestrate the actual turn on of the big dish for Tom Josephson. During the course of rebuilding the damaged installation, and making good the long remote control lines, Tom and I had engaged in numerous verbal exchanges. I had quickly learned that he could not only give verbal barbs, but like a true gentleman, take them as well.

Once as I as inside of the grounded dish repairing a panel

section he ambled out to inspect our progress.

"Well, d'you think you'll have that bloody thing you are inside of working while I still have some breath inside of me???" he bellowed.

"You are so cantankerous, you'll be here to see this thing

work if it takes me twenty years!" I bellowed back.

My grand game plan for the big "turn on" went this way. A TV set would be set-up on the concrete pad. We would invite them out to see F1 pop onto the screen. Then after the anticipated exclamations and back slapping, I intended to saunter five feet towards the swimming pool and throw myself in, fully clothed Bahamian style, while uttering "All in a day's work'

Well, it rained. We had the set outdoors at noon and were eating sandwiches provided by the Josephson kitchen staff when the clouds that had been hanging to the south built over us. We carried all of the electronics, and the remainder of the lunch, to the pump house. At best, precision finding of F1 was going to be more difficult with the TV receiver 100 feet from the dish. And out of sight! When you are alone at the dish, and getting messages from somebody else....who is getting messages from a third person stationed in front of the TV set, well, there are better ways to do it.

Given these circumstances it took us five minutes to find F1; a disappointment to me since I had it figured down to under 30 seconds. Bob Christofanelli had set the Earth Terminals receiver to transponder 12. And then the unexpected. After finally locating transponder 12, we found we had a basic case of terrestrial interference. On Nassaul

We had probably slipped by transponder 12 a dozen times before we found it in the garbage from a terrestrial transmitter. Donny Josephson had bounded over the hill just as we finally found the signal.

"What the bloody blazes is that!" he asked. Like father,

"MIcrowave interference" responded Christofanelli. We stood there looking at almost totally black sparklies dancing on the screen as Bob explained what it was doing. Four, perhaps five of the F1 transponders were jammed with it. By turning off the receiver AFC, we found we could minimize the effects on most of these channels with the manual tuning. That would have to do until Earthstar found the appropriate 70 MHz filter to finally clear it up.

"Could a microwave tower three miles from here cause this problem?" came the query. A minute later, in Tom's office, we had a map of New Providence spread across the floor

"The tower is here" a finger pointed "...and it points this way". "This way" was straight towards us. "And Bahama Tel is over here" the finger moved, "...and it points this way". Again, straight at us. To frost the cake, we were located on a hill with a clear line of sight...to both.

The interference on a few channels aside, an hour later the TVRO receiver was in the master bedroom. The whole family was gathered and the big F1 signal was clean and clear on the large projection screen there. The long 800 foot remote



SAM JACKSON's ET/6.00 - bringing American technology, education and entertainment to the Bahamas.



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CSD/2-82/6



# SATELLITE DIGEST-

control lines had been neatly buried into the main house building by the grounds staff.

Meanwhile, over at the Jackson residence, the second ET/6.00 was also completed. I was accepting the congratulations of Sam Jackson and friends as Sam was going through a ritual I never tire of; tuning the receiver through the full range of F1 transponders. Transponders 10 and 22, both west coast feeds, had just a trace of black sparklies in the receiver AFC mode. Manual tuning took them out. "What is that" Sam asked? By now we knew. "Terrestrial interference" I explained, and noted that we'd have to locate a 70 MHz filter for the system. Only transponder 21 was below threshold, and after we had left a worker would uncover a bad crimp in the 1/2" Heliax cable, which, when repaired, would clear that one up

I paused in the gathering twilight and contemplated my Bahamian experience. I hadn't been there to see the tourist view of Nassau; the changing of the guard, the old fort, or the casinos. I felt sorry for the tourists. What I got out of my visit was the human exchanges that occur as we rode back and forth to the job sites with the Bahamas Electronic crew, the new friendships with the Jacksons and the Josephsons. And what I left behind was a touch of "American civilization"; two small, but living monuments of American technology to be shared in a living form day-in and day-out, by the Jacksons and Josephsons. Low-cost TVRO technology is re-shaping the world, a notch at a time. And I am pleased to be a part of that change.

# F3R IS **OPERATIONAL!**

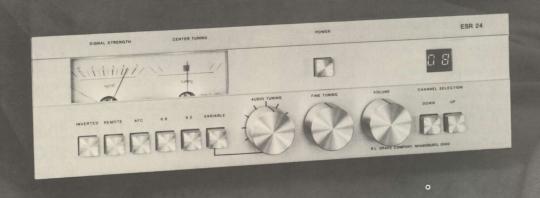
### **F3R ON THE AIR**

In the January issue of CSD we reported that as of mid-December RCA was forecasting that there would be regular "test" signals on F3R on Monday, the 28th of December. Alas, it turned out that RCA pushed up the fully operational date, and by midnight on the 28th (start of the 29th) virtually everyone who was going to be on F3R was there; at least the

initial group.

And so the two year saga of F3 drew to a successful postlaunch completion. F3 started off in December of 1979. The bird was to be many things. For example, it was to be "short spaced" to RCA F1 at 132 degrees. RCA had volunteered their own F1 / F3 combo as a "test" of 3 degree spacing for small (CATV) terminals. It was also to be the primary "Cablenet" bird while F1, at 135 degrees, would become an 11 transponder "Cablenet" Two. All of this and much more went down the drain when F3R, during that portion of the launch sequence where a satellite is transferred from an elliptical low / high orbit to a geo-stationary orbit. Back in early

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December of 1979 a technician pushed the button to start the transfer orbit operation...and northing further was ever heard from F3.

RCA was caught with its birds down. F3 was an on-ground spare. They were pushed into launching it, for regular service, for several reasons. The primary reason was the explosive growth of cable programmers clamoring for transponder space. Behind that one, RCA saw a rush of new satellite operators coming and they hoped by getting F3 into orbit they could tie down (or "up") an "extra" Clarke orbit position. When F3 disappeared, a "cooling off period" began, and it has lasted two years and two weeks; almost to the day.

F3 was just like F1 and F2. F3R is slightly different Those differences may have been worth waiting for. F1 and F2 have 5 watt output power transponders. Evidence suggests that as F1 neared the six year life point in a forecasted seven year life span, many of those 5 watt transponders were doing well to put out 3 watts. F3R is partially-like the newer F5 family of birds, with higher power transponders in four of the 24 slots. Eight point five watt transponders to be exact. The difference between a 5 watt signal and a 8.5 watt signal is close to 2(.1) dB. Or to put that into on-ground terms, the difference between a ten footer and a 14 footer at the receive site.

F3R has ten percent more on-board fuel and ten percent more battery capacity. It needs the extra battery capacity for the 4 higher power transponders. It also has, or was said to have, an operational difference which people in the southeastern USA would appreciate; a boresight more south and east than F1, resulting (RCA forecast) in better signals in areas such as Florida.

As we prepare this report F3R has been operational only days. The observations and reports we have to digest are our own, from down here in the Caribbean, plus those filtered through the telephone and on the amateur radio net which meets on 14.308 MHz each Sunday at 2 PM eastern time. What we report to you here is probably valid, but it is not the "big" picture by any means. We are looking forward to receiving dozens, if not hundreds, of reader reports using the form first published in CSD this past October. From those detailed reports we'll pin down, hopefully as soon as the March issue, the most detailed set of numbers available on the true operational condition of F3R.

Up front, these sweeping observations. Overall, from reporters in California, Colorado, Florida, the Virgin Islands and all points between, F3R gets high marks as being a "superior bird". Comments such as "We get better pictures on our five meter dish, on F3R, than we were getting on F1 with a ten meter dish" (Virgin Islands) are typical. On the flip side, our own observation that the "A" set of horizontal transponders (making up transponders 2,6,10,14,18 and 22) are not better than F1 down here in the Turks and Caicos; they are not even as good as F1. WTBS and CNN have gone from marginal sparklies (down) to modest sparklies. Up in Colorado, an observer equipped to measure carrier to noise ratios reports the same antenna "set" (2,6,10,14,18 and 22) came up "only" 0.5 dB at his location.

The change over to F3R came on with unexpected speed. From early in December F3R could be "found" by parking the antenna at 131 and sweeping through the channels. Typically, the pre-video-modulation tests indicated all of the transponders seemed to be working although they were not all of the same strength. There is a message here for those who have joined this game since the launch of Westar 3 (1979). The testing procedure, prior to actual video-modulationfireup, is designed for transponder checking with test equipment; not video receivers. The procedure works this way:

1)Initially an unmodulated CW (continuous wave) carrier is sent to the bird by an uplink. This CW carrier validates that the transponder survived the launch sequence, and provides a reference signal for additional testing.

The amount of CW signal sent to the bird under this test exercise is seldom up to the "saturation point". That's the phrase used to indicate that any more power arriving at the

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VSWR 1.25 or less

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# SATELLITE DIGEST-

satellite will not increase the transponder output. In effect, the transponder repeats or rebroadcasts what goes into it. If the input signal is "weak", the output signal is "weak". If the input signal gets stronger, the output signal gets stronger. Up to the point where the transponder is saturated; or, operating at its maximum (rated) output power level. And that is 5, or, 8.5 watts on F3R. Again, a CW signal seldom saturates the transponder, so when you tune in a test signal like this you may be seeing 5.0 watts coming back, or 0.5 watts coming back. It is dangerous, even foolish, to try to make such sense of the received signal levels during this test phase, unless you are privvy to the actual output power / operating condition of the transponder you are observing. And the test technicians vary that power, up and down, on and off, as part of their testing sequence.

2)After a CW signal has been fed into the various transponders (RCA has the ability to fire up all 24 transponders at one time this way, or any number from 0 to 24), they then move on to something called "sweep testing". This is a test, again at reduced power, of the "linearity" of the transponder. Linearity testing tells RCA whether a transponder can handle a fully modulated, color, TV signal with audio sub-carrier(s). Typically, they sweep only one or two transponders at a time, and usually only one from each of

their uplink test facilities, at a time.

3) Finally, they will put up a modulated (color bar or whatever) test signal and play with the power levels to verify what the transponder is doing with varying input power

All of this was done, daily, between the 10th or so of December and the 27th of December. RCA saw the testing progressing properly early in this sequence, and around the 12th of December advised tenants on the F1 bird that December 28th was a "planned for" transfer date. A notice of affiliates, from WTBS, read like many:

"RCA has announced that they may start transmitting

program services via FIIIR as early as Decmeber 28, 1981. Some services will be transmitted on both F1 and F3R simultaneously, for a bried period, from the start of F3R service".

RCA then proceeded to assign "transfer times" to each user of F1. The schedule started at 0535 (AM) eastern time on the 28th. RCA uplinked services would be on both F1 and F3R simultaneously, starting at that hour; and then in 30, 60 and 120 minute intervals for the balance of the 28th, additional services would "move over" to F3R from F1. As the WTBS notice indicated, some of the services would continue to be up on F1, even after appearing on F3R. But not all.

WTBS, for example, advised users:

"WTBS, and Cable News Network, will be transmitted via F3R at 131 west beginning at 12 noon EST on the 28th. A secondary feed of WTBS and CNN will continue to be transmitted via F1 at 135 west until 6

PM (EST) on December 31st".

RCA, with their massive facilities, was able to generate identical or parallel feeds for many services, to both birds, at the same time. Those services included (at the 0535 AM turn on) transponders 10, 12, 18, 20, 22 and 24 on the horizontal set, and, transponders 9, 13, 17, 21 and 23 on the vertical side. Additionally, during the wee hours of the 28th, non-RCA uplinked serivce from PTL (TR2), Spotlight (TR4 on F3R; switched from TR19 on F1), and CBN (TR8) moved to F3R. The only "surprise" in this particular early morning turn-on was that the RCA Lake Geneva (Wisconsin; serving Chicago) uplink for WGN was not on board at the 0535 point; Lake Geneva is run by RCA.

First impressions often turned out to be erroneous. Early on, there was every indication that **east** of the Mississippi and **south** of the Great Lakes, the new Spotlight service on transponder 4 "had to be" a 8.5 watt channel. It stood out head and shoulders over the other transponders. But then, several hours later, the fabled "hot transponder' of ESPN

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(TR7) was up and operating, and then It looked like an 8.5 watt service channel. The rug was yanked again, around 11 AM eastern, when RCA fired up WGN on transponder 3, and it buried Spotlight and ESPN by a dB and more at most locations.

If the strong ones stood out, the weak ones dropped out. In South Florida the "western bore sight" pattern for transponders 2, 6, 10, 14, 18 and 22 "jumped out". TR22 lost more than 2 dB, from F1, according to one chap who measured it on both birds. Here in the Turks and Caicos, 22 gets our award for being the weakest transponder on F3R.

Up in Colorado, measurements found 24 up 1.5 dB over F1; 9 and 12 up around 1.0 dB, from F1. In Michigan, an observer checking in the special Monday version of the Sunday hamsatellite net reported all of the pictures looked better to him on F3R; and his most telling observation:

"On F1, there was a considerable difference transponder to transponder. On F3R, the transponders seem much closer together in quality."

If that proves to be the case as the numbers roll in, RCA will be pleased with that report. Uniform service levels were a problem on the 28th. Our own observations indicate that uniform service may be a problem that is extending, and could extend, far beyond the 28th of December.

In our own instance, we had the 6 meter Hero dish on F3R at 6 AM. We had just under an hour to observe since at 7 AM we had "a date on Westar 1" that the people of the Turks and Caicos Islands insisted we keep. At that point, we were still under the impression that RCA intended to keep the F1 services operational for perhaps 30 more days. When we brought the six meter dish back to F3R, a few minutes after 9 AM, it was evident that that might not be the case. The services still on F1, where our heavy, AFC five meter, dish was anchored, were starting to disappear. It looked to us as if F1 might be "dark" in a matter of days!

Given that actuality, plans were rushed into play to get our own five meter dish moved over a tad. In our case, setting off far to the east, the move was a snap. F1 is at 17 degrees elevation; F3R at 20.5 degrees elevation. And that (3.5 degree) move was the "big one". The azimuth move was under 1.5 degrees.

As the services continued to pile onto F3R through the noon hour, we began to loosen lock-down nuts on the 5 meter dish. They had been sitting 100 feet from the ocean, cinched down tight, for 15 months. To our relief, the galvanizing and coatings of grease kept everything "clean"; our hat was off to AFC for building a sound structure! I set out to make the move totally alone, on purpose. After thirty minutes of bolt and nut loosening in the abnormally hot late December day sun, and feeling sorry for myself, I remembered a chap we heard on the ham radio net who was setting out that same morning on a one week trip. His employer, a cable TV firm, had given him directions to move a total of 33 dishes from F1 to F3R. In seven days time. That worked out to five per day, spread over four states and more than a thousand miles of circuit. I suddenly no longer felt sorry for myself, and began wondering how the cable firms in his string, at the end of the line, were going to handle several days with no satellite service on their satellite service channels, with F1 service quitting ahead of

With the Hero dish locked onto F3R, for reference, I ran the elevation strut adjustment rods up to 20.5 degrees elevation, first. Well, almost. I got as far as 20.3 degreees, according to the inclinometer, and ran out of threaded rod. To get more rod, I was going to have to demount both of the two back support struts at their base (one at a time!), and move the rods "up a hole".

Then came the azimuth change. Here I pressed Kevin into service. Armed with a walkie talkie, I listened while he read off to me signal meter readings on a pair of AVCOM receivers; one on a vertical transponder and another on a horizontal. I had to move the dish just over two inches to the east (counter clockwise, from above), to find F3R. Our WGN signal quickly

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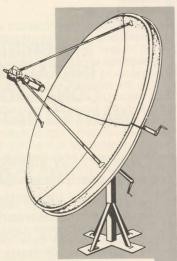
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pinned the meter but the WTBS signal didn't fare as well on the horizontal side. In just a few minutes it was all over. Our only casualty was a two inch gash on my head, sustained when I dropped a 12 inch money wrench, stooped to pick it up in the sand, and then riased up under one of the heavy elevation struts on the AFC dish. A couple of stitches and it would be as good as new.

Several signals that had been "in the mud" for us, in recent months, gave us good reason for back slapping and the traditional shouts of "Wow - look at that!!!". Those that improved markedly, for us in the Caribbean, included 5, 9, 13 and 17. Yes, if you remember your satellite antenna set technology, they are all on the same "boresight" transmitting pattern. Nine and thirteen measured up by 2 dB here. At 4 PM on the 28th.

Several hours later a number of the transponders had lost more than a dB of signal. We went back and re-measured carrier to noise ratios on a few and found WGN, which had been as much as 2.5 dB above our threshold, was down to -0.5 dB reference threshold. A 3 dB drop was clearly going to be trouble if it was doing this all over! WOR on transponder 17 was another one varying up and down with (it turned out) cyclic regularity. It will be interesting to see how these variations iron out across the full footprint area, over the first month of operation or so.

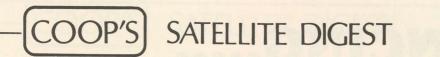
The disappointing performance on transponders 2, 6, 10, 12, 14, 18 and 22, at least in the southeast and points to the southeast from there, is probably something we will have to live with. At our location, at least, the signal level drop is most noticeable on transponder 22 and then on 6. WTBS clearly has suffered in this move.

RCA points out that this particular antenna set (on F1 and F3R) is really a "western boresight" pattern; that it has always been intended to be "better to the west" than it is in the east. There was a 1.0 to 1.5 dB difference in this set versus the other horizontal set (4, 8, 12, 16, 20 and 24) on F1; now the difference is closer to 2.5 / 3.0 dB on F3R. Again, it will be interesting to see how the full picture, continent wide and beyond, tracks this same comparison long term.

In the incidental information department, RCA set out to make F1 the "Cablenet Two" bird back in 1979, but now the new F4 bird is scheduled to take on this task, so what is planned for F1? RCA advises that they expect service from F1 until the launch / operation of F1R begins (expected April 1983). In that period, F1 will handle what RCA calls "work-horse assignments". This will include moving some of the F2 Government Services Administration telephone (SCPC/FDM-FM) traffic over to F1; there are presently 1,200 "leased circuits" in use by the GSA. F1 will also become the new home for CBS, NBC and Robert Wold's new digital audio networks. Also moving to F1 will be a new, aggressive RCA program of locking head to head with Westar for closed circuit, sports and specials traffic. This all means that F1 will not become a "dead bird", although exactly how the 22 active transponders (4 has been dead since launch in 1975 and 13 is erratic) will be configured after the last of the "dual feed" cable services moves off of F1 remains to be seen.

Which brings us to the lauch, and turn-on of F4. On the assumption that the F4 launch went off on schedule (January 14th), and the bird then makes the transfer orbit move properly, we can expect **some traffic** there and testing before the March CSD arrives in the mails. Like the F3R activation, we are asking readers to fill out a log sheet (appearing in this issue) to "share data" on the apparent coverage of F4. This data will then be compiled, and put into map presentation and report form, so that we all might benefit from the "big picture" here in CSD.

There are two possible reasons why F4 might not go on schedule. There have been persistent and totally unconfirmed rumors that RCA "almost lost F3R" during the final stages of the sequence that brought the bird to 131 degrees west. If they did, there will be an effort to pin down what went wrong, and then to take steps to see that it does not repeat



CSD/2-82/11

### COOP'S SATELLITE DIGEST F4 TO F3R COMPARISON ANALYSIS

Instructions: What we are trying to do is to compare, at your location, the overall performance of F3R (which by the date of the observations should have stabilized as much as it is going to stabilize), and, the new F4 bird at 83 degrees west. Try to make your F3R observations the day after you make the F4 observations, or the same day. Send completed forms to CSD, P. O. Box 100858, Fort Lauderdale, Florida 33310 immediately after completing. Tabulated results will appear in the first available issue of CSD.

Your Name		The second of th
Address		
Town/City	State	Zip
Dish Sizefeet;	LNA Temperature	; Receiver Type
F4 Observations: Made at	ST on	, 1982
F3R Observations: Made a	atST on	, 1982
F3R Observations	F4 Observations	Best Six Transponders
Trans. 1	Trans. 2	On F4:  Notes:  If you are capable of CNR measurements, please use that technique in reporting. If not, and you have a receiver with a relative signal level meter, use actual meter readings in reporting. If neither applies, use "B" (better), "S" (same) or "W" (worse) indication on F4 only since your reference will be F3R signals.
Trans. 22 Trans. 23 Trans. 24	Trans. 22 Trans. 23 Trans. 24	discriminator and signal level) be sure it is in
Trivia and other observation		

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with F4. Better to delay a while than lose another bird. There is also the confirmed report, from NASA, that there have been "extremely large tip-off errors" associated with the burning of the PAM-D payloads. Translation? When the STAR-48 McDonnell-Douglas / Thiokol package goes thorugh the second-(rocket) stage separation procedure, the cone portion of the load is supposed to have a particular "angle" (with respect to the load) by which it leaves the "ship". This angle has **devlated** with the recent SBS-1, SBS-2 and F3R launches, as much as 27 degrees. This is not an inconsequential problem since the trajectory during launch sequence of the payload can be adversely affected by the tip-off angle. NASA believes they have pinpointed the problem, and have it solved. Still, there is some uncertainty about it all and F4 could be delayed as it sorts out.

Which brings us to what to expect on F4. RCA will not release transponder assignment data until the bird is ready to be occupied. That will be, in the best case, about a month after you receive this issue of CSD. Recently RCA did sell, outright, a pair of transponders on F4 to CBS, Inc. and that brings to 17 the number of transponders "spoken for" as of early in January. RCA plans to hold onto a pair of transponders (just as they are holding back one on F3R) for emergency service.

All of the present cable service channels on Comstars D1/D2 will move to F4; just as the F1 folks moved to F3R. Joining them there will be 9 others who have signed up separately for transponders. Not all of the transponders will **intially be** occupied; the two held out by RCA aside.

The biggest question associated with the operation of F4 is the way the RCA approach to antenna boresight, on four separate antenna sets, will function in a location far to the eastern end of the orbit belt (83 west, roughly due south of Tampa, Florida). RCA transmit antennas have always had strange, unpredictable "sidelobes". The area **likely** to suffer, **If** conventional wisdom holds, will be Puerto Rico and the islands further to the east. But it is all conjecture until the bird gets on station.

Finally, this note. When Westar 4 launches on or about the 25th of February, we'll have yet another "learning experience" to go through. This will be the first "direct replacement" of one existing satellite (Westar 1 at 99 west) by another, new satellite. This will also be the first expansion from 12 to 24 channels by Westar, and it will be our first look at a brand new design 24 transponder satellite. How well the Westar 4 satellite works will set a pattern to be with us for up to a decade to come. It promises to be an interesting spring!

# INDUSTRY AT LARGE

### CORRESPONDENCE, NOTES, REBUTTALS AND CHARGES . . .

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### LAST LETTER

English TVRO pioneer Steve Birkill, well known world wide for his early exploration of direct "fringe area reception" from the US ATS-6 satellite while it was serving as a test project for India back in 1976, and more recently for his contributions to receiver system technology (i.e. development of the PLL circuit for TVRO demodulators), is now in the United States. Birkill has been engaged as chief scientist for SatFinder Systems in Tulsa, Oklahoma where he will be completing work on a number of new receiver system packages.

Birkill has for years maintained a lonely, one observer vigil of the Atlantic and Indian Ocean Intelsat birds. Much of what we known about the day to day operations of these satellites has come from Birkill observations. He was the first to receive the Molniya "inclined orbit" transmissions, on a private basis, and many of the reported observations for the Ghorizont birds over the equator have come from Birkill.

His latest, and probably last, report on Intelsat activities reports the following data:

1)Intelsat IV F3 at 53 degrees west is the new "mid-Atlantic" bird. F3 has been moved to this location to provide services to nations such as Mexico, Argentina, Columbia and perhaps Brasil. Mexico's desire to establish an "interim" television relay service was the primary reason Intelsat broke the F3 bird out of the cluster located around 20 degrees west, and brought it to the west. Mexico is planning a pair of DOMSAT birds for the 1985 period, as previously reported in CSD. The 53 west location should make this Intelsat service bird visible to most of the USA east of the Rockies.

2)Most of the Atlantic Intelsat global beam leased services are now operating on Intelsat V, F2 located at 21 west. Signals identified by Birkill include daily "broadcast" type services (inter-connecting national network headquarters to remote terrestrial VHF TV transmitter sites) from Sudan, Saudi Arabia and Niger (all described by Birkill as "quite strong") plus Zaire ("weaker").
The Niger (not Nigeria) TV proved difficult to identify

The Niger (not Nigeria) TV proved difficult to identify because, Birkill reports, "their presentation is so poor,including handwritten captions, and a general lack of professionalism".

3)Ghorizont-4 at 14 degrees west (nominal) continues to be a six channel "capacity" bird with seldom more than a single channel in real service. 3875 MHz is the primary service channel (roughly equal to US receiver transponder 9), operating on a global beam which includes coverage into North America (the "Cuban" connection). Steve reports it takes the Moscow-1 feed ('Vremya, for example"). The 3825 MHz channel (roughly equal to transponder 6 on a US receiver) remains an Intersputnik "spare", typically transmitting a "test card" (type 0167) for most of the 24 hour day. This is apparently on a hemispheric beam, favoring Europe. On occasions it is seen carrying separate programming. The 3775 MHz channel has never been seen carrying TV; SCPC services are there and can be tuned in with a baseband communications receiver as detailed in Coop's Operations Manual. Two channels, 3725 MHz and 3925 MHz, have been apparently out of service since the end of 1980.

On the subject of Dutch use of Russian TV programs, via



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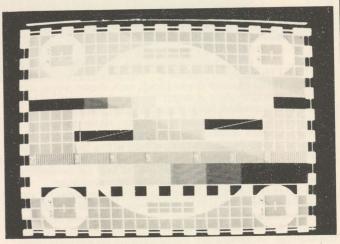
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G(h)orizont, Birkill notes "The Russians are not subtitling any of their transmissions; in English, Swedish, Dutch or anything else. I cannot believe they are at all concerned at a handful of enthusiasts or even one or two (Dutch) cable outlets taking their programmes. I do not see them taking such a (costly) step for idealogical reasons. Their news coverage is notable for what it omits rather than what it contains. True, a few programs ("Today In The World", "International Panorama") concentrate on the "American Imperalist Threat", but not in a way that a western observer would take seriously. What really frightens the Soviets is a cultural invasion in the reverse direction; and I don't see the Russians making the first move. Subtitling in any language other than those used within their sphere of influence would certainly be a "first move". The "European Spot Beam" (my own term, from available evidence) of the 3675 MHz channel on G(h)orizont-4 exists to serve small terminals in European USSR for rebroadcast use; not for the dissemination of propaganda to western Europe. In short, I shall believe the "sub-titling rumor" when I see titles; and not before. Unfortunately, the "rumor" has gotten as far as the serious press here in the U.K., but I think one can trace its propagation to a Swedish source".

Steve, and others, have been concerned about possible back-lash from the publicity already building after the Dutch cable system "experiments" with Russian reception. They fear that both the use of the Russian signals, and, the importance of the use of the signals on whatever basis may be generating high government level confusion, and fears, that could result in premature legislation against a technology which is in truth (in Europe) not yet off the ground. Steve adds "My fears are not "sour grapes"; I admire...what has been done to improve awareness of the satellite service. I just wish that the stories reported in the press were not such exaggerations, stretching the bounds of truth at times. There certainly is room for the Americans and Canadians, with consumer hardware available, to sell to a 4 GHz terminal

market here"





### **GHORIZONT 0167 TEST CARD**

Most, if not all, of the limited amount of 4 GHz terminal hardware now in Europe has come from the USA; or has been home built. The Dutch cable firms, reported previously here in CSD, are using Taylor Howard designed receivers, and the LNAs have come "off-the-shelf" at US LNA supply houses. The only TVRO efforts for hardware in Europe are directed at the 12 GHz DBS services, which several European countries are now planning and building for; with 1983 and 1985 launch dates. It appears likely that 4 GHz technology may be slow to develop in Europe, if in fact it develops there at all.

### **CANADA AT WAR**

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government policy of satellite dish restrictions. The government is appealing, of course, but Communications Minister Francis Fox admits (in the Canadian press) that the official policy boils down to harrassing the owners and would be owners of dishes to slow down the acquisition and retail availability of dish antenna systems long enough for the Canadian cable and broadcast networks to get established. Bloody insulting! Their mighty thrust, now acknowledged, is to force us by any method available, to resign ourselves to more of the ¢&\*\$# (expletive deleted) we have suffered with so long. I am told that CSD is the source for information on putting in terminals for private, home reception. There is quite a bunch of us here searching for information and we want to get a group of terminals started right now! We need help, and guidance. We have the money and skills required. If need be, we will set up a company to retail these things! Please advise what help we can expect.

James Cullen, for Athos, Ltd. P. O. Box 158 Tusket, Nova Scotia BOW 3MO

The Canadian officials jump about so often with their "official policy" that it is difficult to keep up with Minister Fox and his group. For those out there who sell equipment, here is a hot-to-trot group in the Canadian northeast ready to move. Contact them.

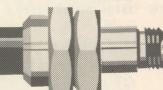
### **LNA CONFUSION**

What do you know about the Dexcel 85 degree K LNA? Is a noise temperature as low as 85 really an improvement over a 100 or 120? Dexcel says in their brochure to contact the factory for even lower noise figure LNAs, or higher gain LNAs. My primary question is simply what would be the "ideal" noise temperature, and, noise figure, and, gain for an LNA to be used here in Oklahoma?

Don E. Dee 1408 Summit Street Muskogee, OK 74401

Generally speaking, you can have too much gain (for a given receiver and feedline situation), but you can't have too low a noise temperature. Noise temperature and noise figure are the same thing, simply stated in two ways. The lower the noise figure/temperature, the less noise contribution to the receiving system by the LNA. Any noise is bad. No noise would be perfect. In the real world, we accept some noise as inevitable. However, the closer the LNA gets to perfect, the more it costs. There are three general families of LNAs about. LNAs created from bipolar transistors are relatively cheap to manufacture but high in noise temperature/figure. They are fine for home building, however, as they are very "forgiving" of builder errors. The best noise temperature with bi-polar units is around 300 degrees. Next there are the GaAs-FET LNAs. GaAs is chemical shorthand for Gallium Arsenide; a manmade structure of extreme purity, ideal for configuring sheets of material used in transistor fabrication. GaAs-FET LNAs are capable of noise temperatures as low as 70 to 75 degrees Kelvin, or just under 1.0 dB noise figure. That's good. But most GaAs-FET batches center around the 120 degree region and it is a rare (and unusual) transistor that produces a noise figure as low as 85 degrees, not to speak of 70 degrees. Actually, to produce an LNA with an 85 degree noise temp, the transistors used must have a noise figure in the 65 to 70 degree region as individual devices since circuit losses degrade the actual transistor specs somewhat. That's why the lower noise figure/temp LNAs cost so much; they don't occur very often. Finally, for the really low noise temps,

the whole LNA is cooled. Cooling lowers the environmental/circuit temperature of the LNA, and when the



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17210 Yukon Ave., Suite #1 Torrance, Calif. 90504 Call COD Orders to: (213) 515-6800 temp is made lower the noise figure also goes down. The RCA and Western Union sites have receiving site LNAs with noise temps in the 15 to 25 degree region. The cooling "systems" are physically very large and highly complex. The LNA package, including cooling, costs them upwards of \$50,000 per LNA. They monitor the actual noise temp on meters fulltime, and a change of a degree or two sets off an internal alarm system that alerts a technician to a possible "failure". Now for the rest of us, the decision of 85 versus 100 versus 120 is fairly simple indeed. Use no better an LNA than your antenna size dictates for the part of the USA you live in. A ten foot dish, in Muskogee, Oklahoma, with a 120 degree LNA, will produce perfect pictures from most of the channels up there in view. Check around your local area, at several installations. When you see a picture you like, use that system equipment as a guide in selecting your own equipment. An 85 degree LNA costs almost three times as much as a 120. Is it three times as good? No, closer to 20% better in the best case. Those of us using 85 degree units do so because we need every bit of help we can get!

#### TVRO IN DE

I am currently living in Mexico City and since I have very limited access to good entertainment, I believe a satellite TV antenna system may be what I need. However, the articles I have read leave me with many unanswered questions. For example: Will the mountains surrounding the city be a problem? Where else in Mexico would a satellite antenna work? I intend to continue living in Central America or the Caribbean and would like to move the satellite system to other countries. Will it work there? What type of base is required for a satellite antenna; could it be mounted on top of a seven story building? What size antenna would be required here? What amount of time is required to set up a system?

I would like to have a clear explanation of what guarantees are normally given, who services the equipment, and what options are available above and beyond a basic system.

Robert J. Emerton American Embassy, Mexico City Department of State P. O. Box 3087 Laredo, TX 78041

Mountains only cause problems for satellite TV when the mountain (or hill) extends up into the sky so as to block the "direct line of sight path" between the receiving location and the bird's location in the sky. There must be a clear, unobstructed "look angle" to the bird. Recent results from Mexico and your area of the world tell us that six meter size antennas are producing good results down as far as northern Honduras and east to the Dominican Republic. A big, six meter antenna, would mount on top of a building; provided...(1)the roof was structurally strong enough to support the weight, and, the wind loading; (2) you had a way to get the antenna (parts) to the roof in the first place (!). A project such as you describe would probably require between 50 and 80 man hours of effort for a rooftop mount. Perhaps a reader in the area will contact Mr. Emerton to give him additional assistance.

### WILL DOMSATS REACH FRANCE?

In Coop's Column appearing in **Videoplay Magazine**, you mention reception possibilities for US DOMSAT birds outside of the USA. I am trying to get sufficient information together to determine if I could receive any of the "C" band US or Canadian DOMSAT signals from this location at 49 north and 5 east. I am currently involved in CCTV and have access to US NTSC program tapes. My basic question is, simply, can I do it? What about the NTSC to SECAM baseband conversions? Will American interests be involved in any of the newer European Ku band satellites? Will that, possibly, be our best access to

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US programming? Some French designed systems are already being offered for Ku band; two foot dishes with either right hand or left hand circular feeds. The data I read tells me that US satellites don't have this left hand / right hand business. What Gives?

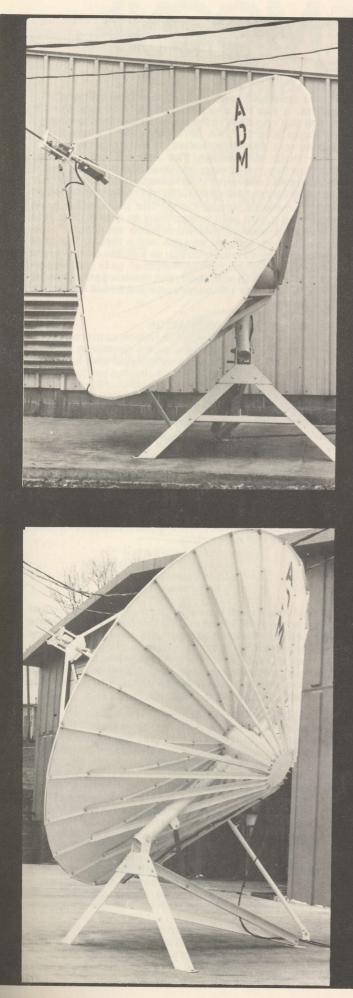
Roland F. Bouteca La Vacherie F-74230 Thones France

No dice on US DOMSATs at 49/5. Even if by some quirk there was a useful "footprint" that far off boresight, your view of the US DOMSAT locations is "blocked" by your horizon. I.e., they are not in your view and "direct" line of sight is mandatory. NTSC to SECAM (or vice versa) conversions are still complicated. However, there is some hope coming up late this year or early next year, when ITT begins marketing an all-world-standards receiver that takes analog TV signals (the standard present format), converts them to digital for processing, and then whips them back to analog. In the processing, they claim to have cured the low cost standards conversion problem. We'll see. Right hand versus left hand. Here is what that is about. There are really four "standard" signal polarizations in use with satellites. We have the US standard horizontal, and vertical. This is what we employ on DOM-SAT birds here. The INTELSAT and Russian birds use right hand circular or left hand circular (left hand is seldom used at present, but will in the future). A transmitted signal can wing away from a satellite in a linear polarization (horizontal or vertical), or circular. Most of us understand linear; circular is simply a continuous corkscrew tread. The signal "winds" its way out of a corkscrew (and hence the name) transmitting antenna rotating on its own axis as it moves ahead. Right hand circular means the signal is twisting in a clockwise rotation as it travels; left hand circular twists the signal counter-clockwise. Just as you can stack a vertical transponder atop a horizontal transponder using linear polarization, you can also stack a right hand on top of a left hand using circular. There are no real strong advantages to horizontal/vertical, or, right hand/left hand. There is this problem. A linear horizontal or vertical feed will see part (about 50%) of the signal level from a right or left hand circular signal. A circular will see almost 100% of both vertical and horizontal; at the same time (!). By the same token, if a linear feed, at reduced efficiency, is used on a bird transmitting both right and left hand circular polarized signals, it will also see both...simultaneously. Life does get complicated! Readers interested in communicating with a European enthusiast should contact Mr. Bouteca direct; he is planning a stateside trip soon.

### **NASTY CATJ COMMENTS**

The November issue of CATJ magazine contains comments by Technical Director Ralph Haimowitz which urge the cable industry to obtain legislation to make it illegal to buy, build or use any type of device to receive satellite signals without a written contract from the signal supplier. I believe Mr. Haimowitz is starting to sound like some of the broadcasters who oppose cable systems. It is difficult to stop progress without sounding foolish. Pushing legislation to outlaw home TVRO systems is a waste of human effort, and will earn the cable industry some very dedicated enemies. I believe the smart cable owner or operator would sell TVRO systems to people who live too far out to be directly connected to cable. The cable industry will make a heck of a lot more money if it grabs the ball and runs with it than if it trys to lay on it in the mud of Mr. Haimowitz's writings.

Charles M. Aanonson, Jr. Aanonson Communications Co. 19170 Highway 99 Madera, CA 93637



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What is the world coming to! When Coop started CATJ magazine, it was the champion of the little guy; the TV business guy who didn't have mega-bucks to throw away. When Coop sold CATJ in 1979 to get STT started, the magazine was firmly dedicated to the development of low-cost TVRO technology. The Steve Birkill column, brought on board by Coop, continues to this day. And it plainly attracts followers in the home terminal industry. A funny thing happened when CATJ got deeply involved in low-cost terminals, under Coop. The publication grew from around 2,500 paid subscribers to over 5,000. It is like anything else in this world; you are "cute" and "interesting" as long as you are not a threat. We take Haimowitz's slam at our industry as a direct compliment of our growth. When "Uncle Ralphie" gets that aggravated, it has to mean somebody out there is getting under his skin. We wouldn't be surprised if the Birkill column in CATJ stopped soon.

SPHERICAL FEED CLARIFICATION

I would like to clarify some of the confusion as to the pictoral diagram which appeared with my article describing tests on Spherical feeds. The test equipment layout that appeared was intended to be a part of an article (not yet published)

describing spherical antenna noise tests.

The article on feed horns was written some four months prior to the appearance in **CSD**. Since preparing that report, the test procedure and equipment have been refined to now measure carrier-to-noise ratio(s). This is the same system used during the Omaha shoot out of TVRO antennas. Using the newly refined system, I have re-run the tests on the Tristar, Vidiark, and Chaparral Spherical feeds. The Chaparral still tested best, but using the refined measurement system the Tristar did indeed show an improvement over the standard "square" Vidiark horn of 0.4 to 0.5 dB. In the interest of fair play, I felt it important that the refined test data be published in **CSD**. When a more refined testing procedure is developed, I will refine the test data further.

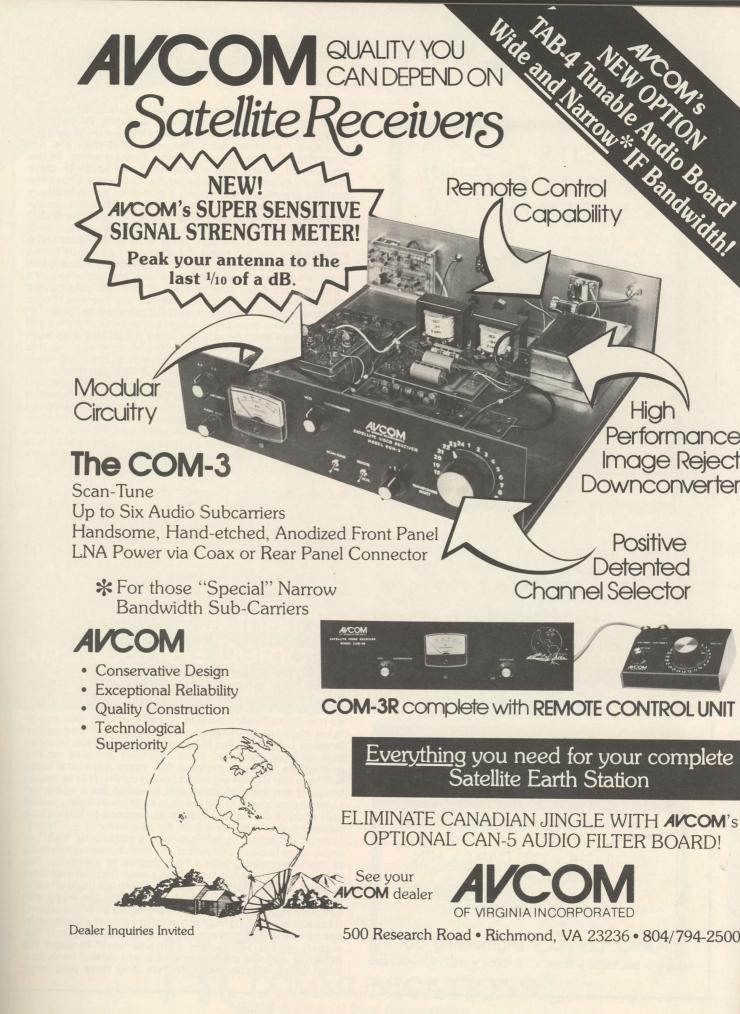
Mike Gustafson Satellite Receiving Systems 1515 Jarvis Court San Jose, CA 95118

We feel vindicated! Since our own original analysis of the Tristar feed published in CSD last spring did indicate it had some additional signal gain over the standard square horn feed, we felt that initially published Gustafson tests may have been in error; a fact we noted when publishing the Gustafson report this past fall. Our own testing procedure is never above suspicion, but on this one we felt pretty secure.

**UNHAPPY WITH SAT-GUIDE** 

I have written to Sat-Guide telling them how I feel about their advertising practices. I feel that Sat-Guide is more customer (i.e. ultimate consumer) oriented, than oriented towards the people who make this industry click. They allow manufacturers to spell out prices at the lowest levels, and this makes it very difficult for a distributor to deal with dealers who need dealers to sell end users. It really makes the dealer look like a bandit! Coop's Satellite Digest is where manufacturers should be advertising; not in the "TV Guide" formated Sat-Guide. What really happens here is that we cannot, as dealers, suggest to end users that they suscribe to Sat-Guide. This hurts the growth of Sat-Guide and in talking with other dealers and distributors. I am convinced that many thousands of would be Sat-Guide readers are being kept in the dark about the existence of Sat-Guide. I would appreciate a comment in CSD as to what you feel about this problem.

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That's a tough problem. Sat-Guide claims, to the program suppliers, that it is strictly a cable TV industry magazine with a smattering of LPTV thrown in. They have repeatedly assured folks like HBO that they are not promoting the magazine to home TVRO owners. In the process of taking this stance that has roots in Dave Wolford's cable TV background, Sat-Guide does have the curious practice of accepting a bunch of home industry advertising. Apparently, Wolford has no trouble accepting home TVRO advertising bucks, only home TVRO industry subscription bucks. By advertising low end, manufacturer or distributor level, pricing to readers who we all know are not cable TV at all, but primarily home TVRO owners and enthusiasts, Wolford reaches a good market for those who advertise there. People who buy a terminal and later find out about low-ball pricing are often converted into being dealers themselves. Folks such as H and R know this, and it does work for them. At the same time, it naturally angers end users who find out the package they bought installed for \$6995 may have cost the dealer as little as \$2400. How to resolve this one? Wolford has to decide which side of the creek he is walking down. Dave Fedric of National Microtech believes the answer is a clean, clearly consumer oriented guide that adds ANIK and WESTAR PBS (etc.) services to the listings. NM says they plan one. We feel somebody will do it, and it will be a success. Wolford could change his advertising practices, but we doubt he will. In the interim dealers continue to "boycott" pushing his book to thousands of potential subcribers. We are glad that's Wolford's problem and not ours!

### **DIGITAL RECEIVER CHANGES?**

I have been reading **CSD** for the last several months anf find it very informative. I have a few questions which I hope can be answered. (1) Will digital signals mean you have to change the type of receiver and LNA? (2) Can a spherical reflector use a galvanized screen mesh of ¼" with a .032 diameter wire, or a lathing mesh screen; the same kind used for plastering walls? (3) Is there any difference in picture performance when using a "super" spherical feed and a standard square feed?

M. G. Nicholson 125 Carberry Cres. Brampton, Ontario L6V 2G2, Canada

Digital signals are really nothing more than a new type of modulation format. That means everything in the system will work just fine, from the antenna back down through the LNA, transmision line, and receiver...as far as the demodulator portion of the receiver. The equipment changes required (if and) when digital modulation invades satellite video feeds will be in the back or video end of your receiver. Such changes are not on the immediate horizon; perhaps five years from now there will be a few digital signals coming down. Not to worry. Virtually any type of mesh will function for a spherical surface provided: (1) the mesh is capable of being pulled taut enough across the spherical supports to form a true spherical-curve surface with an accuracy of +/- 1/16th inch; (2) the openings in the mesh are sufficiently "tight", or small, so as to catch and reflect the intercepted signals back to the focal point(s) with a high degree of efficiency. The general rule of thumb is to stay with a mesh that has maximum angle openings of 3/16th of an inch. There is a trade off here, to be sure. A totally open surface (no reflector wires) will catch no signal. A solid surface will catch all of the signal. Because of the length of the satellite signal wavelength, space-openings up to around 3/16ths of an inch "fool" the signal; over 3/16", some of it will "leak" through the reflector surface while some of it will reflect back to a focal point. Readers tell us that they have had good



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results with mesh openings to 1/4th inch. The transition from a solid (perfect) reflector surface to no reflector surface is fairly gradual at first and the signal "loss" due to leakage increases slowly as the mesh surface opening(s) increase. There is no abrupt transition where, with one size there is reflection. Finally as to the feeds, CSD ran a series of reports early last fall which indicated that a standard horn feed can be improved upon by as much as 1 dB with a "super" or circulated feed.

# **TRANSPONDER** WATCH

## RECENT REPORTS OF ACTIVITY ON DOMESTIC / INTERNATIONAL SATELLITES

Send your reports to CSD Transponder Watch, P. O. Box 100858, Ft. Lauderdale, FL 33310. For late news, call 305-771-0505.

LAUNCH and positioning of F3R had its share of rumors; most damaging, if true, relates that RCA lost control of bird as it neared final 131 west location, "may" have used up equivalent of two years of thruster fuel in regaining "hold" on bird. RCA denies any problems.

SCRAMBLED, international satellite system linking high dollar hotels in Asia, Europe and North America via INTELSAT/COMSAT is in planning stages at COMSAT. Service would



provide variety of international teleconferencing from two-way full motion, full color video down to audio only services. Concept is teleconferencing, on a worldwide scale. Tests may begin late this year.

BANDWIDTH compression scheme developed by Bell and Howell reportedly can sandwich up to 30 color video links into standard 36 MHz wide transponder. System is not capable of "broadcast video standards yet", being halfway between normal fast scan tele-

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vision (with full, blur-free motion) and slowscan (single frame) television. Digital technique uses approximately .5 mega-hertz for each video signal.

CBS has leased a pair of transponders on the new F4 bird. No word yet on how they will be used; CBS has use of transponder 6 on Westar 3 for CBS Cable service and has signed up for COMSTAR network test service due to begin this spring. Because of F4's "cable-dedicated" use, best bets suggest CBS will expand present cable format.

SPACE Shuttle schedule for balance of year has three more test flights prior to November first-date for launching of commercial satellites. Three birds will be "tossed out" in the November flight; SBS's third bird, Canada's Telesat 12 GHz bird, and, government bird. January 1983 schedules launch of Western Union's controversial cost-overrun TDRSS bird.

JANUARY 14 was scheduled launch date for F4; Western Union's first 24 channel bird, W4, due to go on February 25. India's INSAT 1-A to go up on April 8th; ANIK D-1 12 GHz bird August 12th.

JULY is scheduled launch date for Eutelsat-I-1, the first bird available for 12 GHz DBS for Europe. Of the nine transponders on board, seven are to be used by government operated telecommunication departments and two will be used for Eurovision links between nations. No transponders have been set aside for direct broadcasting although the potential, like our C band birds, is there for "modest" home terminals. Bird will be stationed at 10 east, and I-2 is scheduled to go up late in the spring of 1983 and be stationed at 15 east.

AUSTRALIAN decision seems made; 12 GHz. There was a great deal of internal bickering over this decision with strong tug-of-war pulling for 4 GHz use rather than 12. Our industry's Taylor Howard was called to Australia to testify, for 4 GHz proponents. Hughes Aircraft will build three birds, 15 transponders each. Four of the transponders will be 30 watt, the balance 12 watts. Those with 30 watts will have switchable full-continent coverage, or, spot-beam coverage to quarter-sections of the continent. Launch of first bird likely in middle of 1985 with other two to follow in 5 month intervals.

BATTLES for 12 GHz DBS here growing daily. War of words increasing with DBS proponent Stanley Hubbard and CBS VP of engineering James Flaherty exchanging claims and counter-claims before House Subcommittee. Hubbard claims CBS is pushing "high definition TV (1100 lines - plus)" as a means of slowing down or stopping early DBS activities at 12 GHz. CBS says this is the time to plan for future, if DBS gets started using existing 525 line system, high definition TV will never begin. CBS wants DBS slowed down.

USA TODAY, daily newspaper to be printed in 15 major centers via satellite (W3 or W2 planned) got approval from Gannett chain. Tests of distribution in select markets could begin before end of this summer. Effort will be first general-public newspaper to be printed and distributed nationally, thanks to satellite inter-connects.

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QUANTUM ASSOCIATES, INC. Box 18, Alpine, WY 83128 (307)654-2000 **CANADIAN** government forecasts need (in Canada) by year 2000 for 140,000 "**mobile**" ground-to-bird-to-ground satellite links. Canada recently added more than \$100 million to funding of space program, including \$17 million for development of M-SAT (mobile satellite terminals).

THIRD INTELSAT V bird launched successfully and placed into operation for Indian Ocean circuits.

**MEXICO** hedging bet on establishing pair of DOMSAT birds by authorizing INTELSAT to study feasibifity of providing up to 30 transponders for internal "domestic" use. Mexican plan (MexSat) still being pursued as reported here previously.

TELEPHONE circuits via satellite under construction for two new Pacific areas/nations. Micronesia and Marshall Islands will each have INTELSAT Standard B terminals installed to handle up to 40 twenty four hour voice circuits. Provision for delivery of TV also built into package. Marshall Islands has local television service consisting of US taped programs fed out via low power scrambled transmitter.

PROPOSALS to Brazil spelling out manner in which new BrasilSat system may evolve now in Brazilian hands. Leading contender calls for 24 transponders on C band (3.7 to 4.2 GHz) plus up to three transponders in 2.6 GHz region; latter to be used for "community television" reception. Video would also be carried in C band, but primarily for network interconnections.

INTELSAT charges still substantial; Costa Rica's new "Standard A" terminal (100 foot region antenna) cost nearly \$7 million; Standard B terminals (40 foot range antennas) still in \$2.5 million range. Use rates are coming down; fulltime service on a voice grade channel now \$1125 per month for channel use (equipment comes extra) between uplink and some dedicated downlink. Irregular TV use now \$122 for first ten minutes, \$10 for each additional minute. Cost of getting signal into and out of nearest INTELSAT terminal still extra, as is use of terminal equipment.

WHOOPS. Apparently, the acquisition of Dexcel, Inc. by California Microwave is off. Cal Microwave praised the Dexcel technology but said "Dexcel (is considered) too expensive".

RADIO NETWORKING. If you are interested in one consultant's view of future of network radio interconnection via satellite, send \$18 to Waters & Co., Security Mutual Building, Suite 322, Binghamton, N.Y. 13902. Report concludes "radio broadcasters will benefit from use of satellite" but cautions "the size of the benefits will come from constraints originating outside of the radio business".

SBS has placed an order for fourth 12 GHz bird with Hughes; to serve as a spare.

**EUROPE** continues in uproar over promise of DBS service technology. France now leaning **against** participating, believes fiber optic network for national multiple channel TV distribution in best interests of France. Current government there clearly concerned about inward flow of non-French TV to residents. DBS in Europe may become fractured service before it gets off ground.

**DEEP** reading, in Federal Communications

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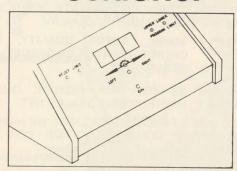
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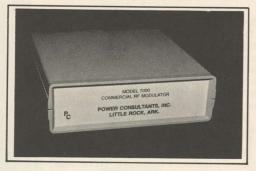


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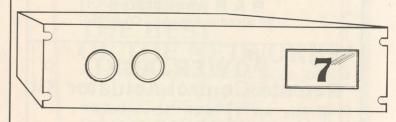
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Law Journal, covering regulatory options for DBS appearing in Journal recently published. You may write for a copy: FCBA, P. O. Box 57109, Washington, D.C. 20037.

CABLE NEWS NETWORK-2 launched on schedule 11:45 PM on TR15, F3R. WTBS and CNN(1) carried opening ceremonies. TR15 signal up to 2 dB better carrier level in southeastern USA, than CNN(1).

C-SPAN now on TR19 on F3R. USA Network programming nearly full 24 hours over on TR9. BET (Black Entertainment Television Network) scheduled to move off of TR9, to transponder on F4R.

SPOTLIGHT service, moved to TR4 from 19 (F3R and F1 respectively) may well become major effort. Spotlight began as Times Mirror cable "house service", distributed only to their 60 plus systems nationwide. Now several fellow "major cable owners" have joined with Times Mirror to beef up service to complete directly with HBO, Showtime and The Movie Channel. Signing on are Cablevision, Cox Cable, Store Cable and Telecommunications, Inc.; four "heavy" partners.

Line-up of new services expected up in the first six months of 1982: On F3R: "Daytime; (joint effort of ABC and Hearst), TR22. Largely slanted at women ala Cosmo Magazine; scheduled start "March". "Cable Health Network" (joint effort Showtime and Dr. Art Ulene), fulltime service to inform public of health matters on TR17. WOR now looking for a new home. Scheduled start-up "April". "The Weather Channel", featuring continuously updated local/national/international weather data, forecasts, TR21. Scheduled start-up "May". On F4: Full channel allocations not yet "officially" released, but it looks like initial occupants will be as follows. TR3, Billy Batts (religiion and family); TR4, Warner Amex (exact service not yet announced); TR6, Bravo; TR7, Escapade; TR11, RCTV (new RCA plus partners service including BBC television features), the Entertainment Channel; TR13, Cinemax (east coast feed for now, who knows later!); TR15, HBO (exact service unknown); TR16, Black Music Network; TR17, Trinity Broadcasting Network (religion); TR18, HBO (east coast, for now); TR23, UTV Network (similar approach to SPN on Westar III). Add to those Black Entertainment Television, CBS Cable for a pair and a second "Entertainment Channel"; transponders unknown.

Line-up for Westar 4 more difficult to pin down precisely this far in advance. Included are the ABC/Westinghouse joint news service effort (for five transponders; 4 out and one "in"), SPN, SelectTV, SIN, Eternal World Television Network, Financial News Network, CBS Cable, EROS, The Home Music Store, ConSat Network, Univision. That's a total of 16, of 24 transponders, available on bird. Look for additional announcement or two upcoming; Western Union may "stop" fulltime, dedicated "loading" at 18 to reserve six for news and sport feeds.

FIRST use of vertical interval on TR3, F3R. United Video beat Ted Turner to the punch by introducing "Electronic Program Guide" January 1. This is a fully automated service that packages block (static) and crawl listings of the full programming available in three hour

# Johnny Carson, Where Are You?

# Comstar 3, Transponder 1

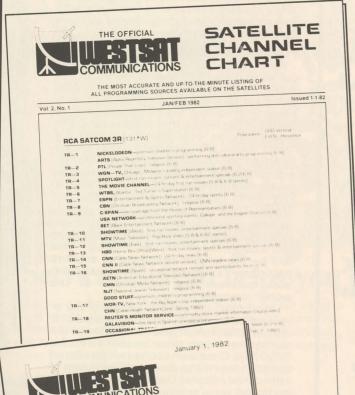
Monday thru Friday

8:30 Pacific

9:30 Mountain

**10:30** Central

**11:30** Eastern

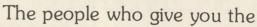


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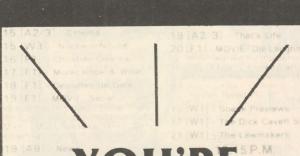
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packages. Interest in using vertical (blanking) interval growing; where is the low cost hardware to access it?

PENTHOUSE may not be going on the bird afterall. Both their Penthouse Entertainment Network and the new, proposed, Playboy service are taking a close, second look at the sale-ability of X and Hard R products on the satellite. Escapade, established service, is still losing money after nearly a year and in spite of big flack over "adult services" appearing in American homes, the marketplace is apparently not responding.

Low-power mid and super band transmitters, fed by satellite services, now operating in Honduras, Belize, Mexico's Yucatan Peninsula. An elaborate three channel system under construction in eastern Caribbean. All have elected mid or super band channels, with converters in subscriber homes, over any form of hard scrambling.

### FORT WORTH IN MARCH

Well, it had been all set up for the next gathering of the clan to be in Cincinnati, Ohio in late April/early May. But then the SPACE group decided they would hold their own, national convention this coming summer; in Omaha. While SPACE tried to figure out if mid-August was the "best" time and Omaha the "best" place, STTI decided to not chance being too close to Omaha, or, mid-August. The result? The first National Satellite Opportunities Conference (NSOC) will be held in Fort Worth, Texas March 26-27-28.

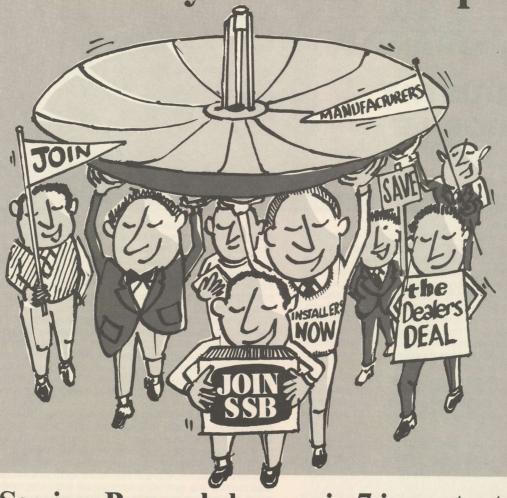
STTI's Rick Schneringer reports that he expects more than one hundred equipment exhibitors in the massive 60,000 (+) square foot facility in the city just west of Dallas. "This will be the largest collection of satellite hardware, equipment, and equipment manufacturers ever assembled in the world" forecasts Schneringer.

Highlighting the seminar portion of the event will be a series of dual training sessions; one set for technical types and another for the management and sales personnel in the TVRO field. Classroom courses will be offered and attendees will be awarded "Certificates of Attendance / Course Completion" for attending the full set of seminars in either category. Also included in the seminar schedule is a look at the new 12 GHz technology, and, the hemisphere-wide effects of both the new US (RCA/Westar) and South American "domestic" satellites.

Housing for NSOC is spread amongst several hotels; the "host hotel" is being filled first, and those staying there will also have access to approximately 30 hours of videotaped seminar and lecture sessions from past SPTS/SBOC/SVC gatherings. Schneringer suggests "To capture the full spirit and flavor of the Fort Worth show, we encourage people to sign up early so they will be accorded the opportunity to stay at the host hotel where the closed circuit, inroom television service will be available".

For information on attending, or exhibiting, at the National Satellite Opportunities Conference, write to STTI at P. O. Box G, Arcadia, Oklahoma 73007 or call Rick Schneringer at (405) 396-2574.

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#### COOP'S SATELLITE DIGEST-

## INDUSTRY PROFILE

Dave Fedric



Dave Fedric / Part Two

In the January **CSD** David M. Fedric, President of National Microtech, was selected as the **CSD** "Man Of The Year" for the private TVRO industry. During the November Anaheim Satellite Video Show Coop spent several hours with Dave talking over where this industry is going, and how we are going to get to those goals. Fedric's firm is the acknowledged leader in marketing of home of small-terminal TVRO products. In approximately one year of operation, National Microtech has grown from a new firm, first showing at the Houston SBOC show, to an international distributor processing approximately 40% of all of the hardware shipped per month within the industry.

How National Microtech grew so far, so fast, provides us with a great deal to talk about and explore. Running through the success of the firm to date are numerous philosophies which many may find adaptable to their own TVRO business operations.

The Marketing Plan

National Microteach has broken the United States down into approximately 180 marketing "districts". As a management handle, the districts are keyed to zip code numbers. The first three numbers in a zip code tells National Microtech which district the call or letter is coming from. When a call comes from an area where a distributor is active, the caller is immediately directed to the distributor serving his area.

Fedric on creating marketing districts. "We sat down and looked at each state, and how the population is spread in each state. The marketing districts are not equal in population; rather they attempt to be equal in "market potential". Obviously there are more potential customers for TVROs in far northern Minnesota (a rural area) than in Minneapolis/St. Paul. Our marketing districts take this factor into account.

"Our approach was to make all of the equipment required for an installation available at one place; the distributor. Prior to this approach, a fellow trying to sell terminals was tied up waiting for all of the parts to arrive from perhaps a half dozen different sources. We saw this as an impediment to system

"National Microtech does not sell franchises. What we have really done is put together a volume buying group. We wanted the ability to go out into the marketplace, in effect representing a large number of distributors, and promise to take all of the product we contract for. But we also want to be assured, by the manufacturer, that he can in fact deliver to us what he agrees to supply. Our distributors are counting on us, and if we have continuing problems with a supplier, we won't be dealing with that supplier again when the contract runs out.

"We have filled 90 of the market districts to date; exactly half. There are 67 distributors and some of these have more than one marketing district which they market to.

"What we really do is act as a purchasing agent and an advertising agency for our distributors. We are a referee and a coordinator for a lot of different businesses. Another way to look at what we do is to say we are "packagers". We do the

same thing now that Channel Master did with some home electronic pieces years ago. When we entered the industry, we had virtually no capital base. We were simply the top layer of a three tier distribution chain. Now we are getting closer and closer to what I consider to be a true two-tier distribution system. We either manufacture for ourselves (the X-9 series antenna and mount), or we contract for large volumes of equipment.

"That's why manufacturers like to deal with us. They know exactly how much money they are going to get for their product, when and how they will be paid. And they remove one of the big variables from their operations; the cost of marketing, and, the cost of collections."

How difficult it is to "police" a national distributor network? Aren't there practical and legal problems with distributing like this?

"We require that a distributor take ten complete system packages per month. However, we have to be lenient, especially when a distributor is getting started, since it serves neither of us to have stuff piling up at his warehouse.

"We have accounts now with us, who started as recently as this past June, who are taking 50 systems per month. The distributors we now see coming on board are people with solid business experience and they are a joy to work with. They use forecasting, spread sheets and they approach the distribution in a logical, common sense manner.

"We ask all of our distributors to give us a fresh, 90 day, projection, each month. We don't hold them to the projections, but we do ask them to put some time into preparing the projections so the numbers are as good as possible. Then we ask them to place their hard orders (for ten or more systems) 30 days in advance.

"We want them to be realistic. If they tell us that 90 days down the road they will be using 100 terminal packages per month, and then we arrive there and they only take 30, well, if we had several doing that at the same time, we'd have our warehouse overloaded and our cash flow would be tied up."

Is this marketing or distribution approach realistic for National Microtech? Can you live with this type of program for several years into the future?

"We have a place in this market. And I think we will continue to have a place here. A lot of other guys have just the opposite philosophy of marketing. Steve Bland (Hoosier Electronics), for example, is almost 180 degrees to us. He works on the premise of offering certain items at the lowest possible (national) price, throwing the pricing out there nationwide, and offering no territories. Everyone fends for himself at the dealer or retail level. He will do well with some products that way, but he may not have distributor or dealer loyalty.

"When you sell only on price, and you are selling the same thing everyone else is selling, you can have a tremendous month followed by a lousy month. When your premise is price, there will always be someone who can sell it a little cheaper. The dealers will move around month by month, following the cheapest prices. That's human nature.

"Our premise is to have different products, either of our own manufacture or primarily available through us because of our buying volume. As long as the products differ, then it becomes a matter of salesmanship. We can handle that.

"We decided early not to use conventional electronic distributors. Most everyone else out there is focusing on electronic distributors. We are out looking for people with the entrepreneurial spirit. Let me tell you a story to illustrate why this works best. One of our early distributors, in southern Louisiana, is an RCA distributor. They are doing over 50 million per year in RCA products. Then in our next marketing district, 100 miles down the road but out in the rural area of Louisiana, we set up a fellow and his wife who had good business sense and a tremendous will to succeed. After a couple of months of settling in, the RCA distributor was barely moving ten terminal packages per month. The little guy? He was selling 30 every month. We like the individual entrepreneur; he is the right guy for this business, at this time in our industry growth."

Your growth has been phenominal. How are you coping with this?

"Well, it used to be that when a distributor called we could tell him off the top of our head what antennas, receivers and LNAs were available. We outgrew that stage quickly and Joe Garner put together a computer program to log equipment into inventory, out of inventory, and to tell us what to expect, and when, in the way of new equipment flow. This was originally done on a Radio Shack Computer. Now we are building a new warehouse facility with everything controlled by computer terminal entry. We have to add and subtract from the computer inventory with each order processed, or we'd never keep it all straight. Plus, we do a physical inventory once per month or so to keep the bugs out of the computer inventory system.

'Transportation has been a real problem to solve. We are on Interstate 55 which gives us good access. We have an 18 wheel enclosed trailer and a big gooseneck. With the gooseneck, for example, we can move 32 complete terminals at a

time. That's three distributors at ten per month.

"Then we use contract carriers based in Atlanta. We pay them by the mile, and pro-rate the load to the distributors getting the merchandise. We learned early that you simply cannot deal with ICC regulated freight companies. They are a real disaster to satellite antennas; picking them up with forklifts, transferring them from trailer to freight dock to trailer several times before they arrive at the destination. I don't care how well you crate a fiberglass antenna, they will bust the crate, drive a fork blade into the antenna skin or stack sharp objects on top of the dishes. You can ship metal antennas, such as the ADMs, this way and not worry. But not fiberglass."

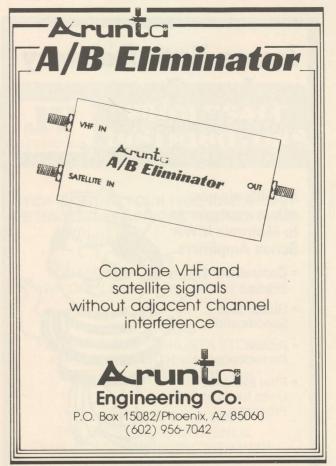
What has the attrition level of National Microtech dis-

tributors been?

"Since last June we have lost three distributors. One of these was John Kaul of Kaultronics. John split off, on his own, because he felt he would rather do his own thing. There will always be fellows, in an industry growing this fast, who see themselves as being national rather than regional; in being a manufacturer rather than being a distributor. I think National Microtech is bringing a lot of good, new people into this industry. We teach them what this industry is all about. Years from now, there will be only a handful of sales leaders that survive. I think the majority of those will be graduates of "National Microtech U"

"One thing I have learned is that the distributors here are a very independent group. We have to treat them fairly, or they will tell us to get lost. They could even all get together and do it on their own. We react instantly to price changes; when we get a price reduction, we pass that price reduction on down the line. We feel that we have to work with our distributors, or we won't be dealing with them in the long haul.

"In October, for example, 95% of our business was re-order. That's a very significant chunk of the business. Back in the early days of the firm, we considered it substantial if there was



20% of our business wrapped up in re-orders from our established distributors. And that was understandable because we were new, our distributors were new and all of our emphasis was on getting new distributors."

What about the dealer level? You don't sell to the dealer

directly?

'Not directly. At least not where we have a distributor. The distributor is our client; the dealer is the distributor's client. The average dealer sells a couple of home terminals per month. The average dealer does not attend these national (SPTS, etc.) shows. He counts on his distributors to attend the

shows, and bring back the information.

'At the dealer end, the sales and business opportunity presented by home terminals is the perfect embodiment of the great American dream. It is something that is new, it is different, and a guy can go out and work and sell them at retail and make money. The distributor can sell them at wholesale, and make money. The manufacturer can sell them at OEM, and make money. The average dealer, I suspect, is probably in it part time; he supplements his regular income selling terminals. If everybody in this business runs their business fairly, each level of participation will come out. That is why it is so darned attractive.

"We don't want people with lots of money. It certainly takes money, at the distributor level, but if we find the right kind of person who will really run and work with this; we'll even try to find somebody else to finance the distributor. We want to see people who will go out there and push and try to make this

whole thing real.

What about the profit margins, Dave? Some people brag about making "indecent" profits; they even term them indecent. What's the right approach here?

'We feel the distributor has got to make a 25% margin. We know, because we were there once. I don't feel he can survive the ups and downs of the business on less than 25%. In the real world, I think most dealers go after a 40% margin; they get



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MWA 320	CZ 8320
MWA 330	CZ 8330

220 Route 13, Bristol, Pa. 19007 (215) 788-2350 • TELEX 996312 MDSTD there by putting 25% on the product and perhaps 15% for the

"I think this is probably fair. If the dealer is selling a couple of systems per month, they are doing far better now than before they got into this. The dealer typically carries no inventory, other than perhaps a demo rig. After they make a sale, they go over to the distributor's warehouse and pick up the equipment. Many of the distributors will give them enough "credit", after they are established perhaps, to take the equipment out of the warehouse, go out and install it, get paid for it, and then come back to the distributor and pay for it. If the dealer has a problem with cable, or an LNA, or whatever, he goes to the distributor for an immediate exchange.

"As a rule, the distributor is not out there competing with the dealers. Where there are direct sales from the distributors, the distributor usually holds up the "area pricing" in the same range as (his) dealers. I have stressed and stressed to distributors that their future is their dealers. As new products come along, and as the distribution network grows, the distributor's real money in this is going to come from having a chain of dealers to move equipment to. If a distributor competes directly with dealers going in, he may find he has no

"I think in this industry, at this stage, this is a workable approach. Perhaps down the road a ways this will all change. But right now this is what works and works best."

Dave, last spring the industry went into a slump. We had a couple of hard months. What caused this, and can we expect similar periods in the future?

"Well, we have always felt that 90% of the people who were "in the market" for this type of equipment are people who live where there is no cable television. I still think the rural people are the major market. If a person has a good cable service available, a TVRO is just hard to justify. Even though the prices have come down, and will come down some more, it is just a big toy to somebody who has 20 or 40 cable channels

"Now last spring the market went down; it got soft. As an industry, we had never been through such a season before, simply because we are such a young industry. This was our first real spring!

I believe people's interest change with the seasons. Remember that our biggest market is rural people. That ties us to the farm or agrarian economy. People in that field of work view each spring as a re-birth of life; a new opportunity to start over. That's when the hard work comes, and that is when there is the greatest amount of uncertainty about the size of the crop, the quality of the crop, and, the value of the crop. You would be surprised how the whole rural economy turns on this unknown. It is not just the farmer who cares; everybody who lives in rural America cares, because if the farmer has a poor year, they will too.

'To this market, television is very important in the winter. It is less important in the warm weather months. Then we had the unusual situation where, during the winter of 1980-81, there was a tremendous shortage of equipment within the industry. It happened that virtually all of the OEMs spent the winter gearing up for a larger production schedule. LNAs and receivers, in particular, were in short supply.

"And it all came together last May. A slump in the market,and a (temporary) over supply of equipment.

"Will it happen again? Well, hopefully the OEMs and the larger distributors, such as National Microtech, will be more careful about overloading the supply lines this spring. On the other hand, regardless of where we sell; rural areas, suburban areas, we are selling to people who have more than the average income. People in the upper middle and high income brackets are harder to convince that what they most need in the world, in the spring, is something that keeps them inside. Not after they have spent the last several months cooped up inside! They simply have too many other options for their time, and their money, when spring comes."

What about the opposite end of the year; the fall? Is

there a complete turn about in say September?

"Absolutely! That's the big bump. Virtually everyone in the business sells everything they can ship starting about mid-August."

National Microtech began as a super distributor, or packager as you prefer. Then you got into the antenna fabrication business. What thought processes led to the involvement with antennas?

"I feel our future is in antennas, along with being a national distributor or volume buyer for our distributors. I believe the electronics, all of the electronics, will eventually come from offshore. I know that in Mississippi we cannot compete with the highly technical end of the business. But we can compete very effectively when it comes to hard labor. We have a good labor force in the region. They can make fiberglass, and they can make things out of metal.

"For example, we have a family of welders now doing our mounts. They just put up a huge new building just for our mounts. This family, of five sons and a father, were going under; they were on their last legs with their banker. Now they have more than 20 welders working, and they work at minimum wage. You can't get talented people to work like this, for minimum wage, any place in the country except in northern Mississippi. They work 16 hours per day, and they are presently turning out over 1,000 mounts per month. You know, this has really turned into big business!

"The LNAs, I feel, are probably too highly technical for someone without microwave experience to tackle. You could hire the expertise, but the investment would be huge, and in a short period of time they will be coming in from offshore like stacks of cookies. Receivers...well, you can build them if you have the right people. But, we see changes coming so fast in receiver designs that I am not sure you can ever really get tooled up for production in that area before you have to change the design to bounce out a new model. It is like having a new child every six month or so."

I have heard several stories about the evolution of the square X-9 antenna. Let me ask you straight out, how did it come about?

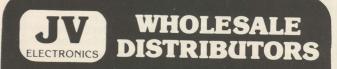
"The real trick, for us, has been the X-9. I could tell you we spent two years with a computer working it out. But that is a bunch of hype. The truth is that I went out into our yard one day and watched us trying to ship a trailer load of round parabolic antennas. I was fed up with the crating and shipping problems for these big antennas, and I studied a 13 footer wondering how you would modify it to be able to get it into a truck easier. One of the thoughts that crossed my mind was that you take a high quality, one piece, 13 footer, which you cannot ship, and you trim off four sides; make it square. Now you would have a five piece antenna, but where the pieces would join together would not be down through the center (where mis-fitting pieces tend to mess up the gain and the pattern), but rather they would be around the outer edges of the reflector.

"Now, you can make a **few** panelized fiberglass antennas and get the panels to align, and the antennas to go together properly when you get the pieces into the field. But as soon as you try to build up the production, invariably the molds are not all going to be exactly the same. And nobody wants an antenna in the field with three or four pieces that all came off of separate molds. They simply cannot and will not align properly.

"So I said to whoever was standing nearby "fetch me a skill saw". When the saw came out, we chopped four sides off of the round parabolic. That gave us a square antenna. It sure looked funny, but we went ahead and hooked up a feed and LNA to it, and you know what? It worked.

"Then I went back and said 'alright, we make them square from now on'. The dimensions will be 9 feet 4 inches on a side, because that is the largest size we can crate and get into a semi-trailer.

"All of those fellows who said it wouldn't work were surprised. I guess I was too. I finally had to tell them "show me it



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#### **National Microtech Distributor Profile**

Johnson's TV and Sound is a distributor for National Microtech. Johnson's Bob Green, a veteran of the TV sales and service business, attended the Houston SBOC show in the Fall of 1980 and became one of the first to make a decision to

'go with" Dave Fedric, Horton Townes and crew.

Johnson's has been a large scale dealer for Sony and other top-of-the-line video hardware for more than a decade. They operate out of a shopping center in the plush northern fringe of Oklahoma City. Their retail customers are treated to several large showrooms filled with moderate to high priced video and audio equipment. Behind the showrooms is an extensive service center for the many product lines they

Johnson's sent Green to Houston to select a source for TVRO hardware. At the time there was no dealer in TVRO hardware in Oklahoma City; Johnson's would pioneer the effort. Green took his report back to Al Johnson and recommended that they affiliate with National Microtech.

"I guess the key thing with us, when we were first entering the field, was the sincerity of the people we would be dealing with. Everything they told me about their operation, what they could do and could not do, was straight forward. I heard a lot of funny stories in Houston;

but not from Dave Fedric"

What else made Green recommend National Microtech? "They were not selling "franchises"; there was no front money. When they had the equipment on their dock, ready to ship, then you sent money. That indicated to us

they were not trying to work on our money. We like that." How has their relationship with National Microtech en-

dured?

"Even better than we expected. They kept me supplied with equipment, even when it was in short supply. And through them I have an excellent relationship with the equipment manufacturers."

How does a distributor handle repairs?

"As a distributor, when we have a problem with a particular piece of equipment, we deal directly with the manufaturer. This saves us having to ship back to Mississippi, and they back to the plant. We have found that we get excellent treatment with the manufacturers because we are a part of the National Microtech network, and they are a big volume buyer. One of the receiver suppliers, STS, has developed enough confidence in our abilities to allow us to diagnose problems in our shop. If we can fix it, we do, thereby saving turn around time. If we can't, it gets expedited treatment from the factory. KLM is negotiating with us right now, to allow us to become a regional service center for their receiver products. We have always been very service conscious, and our TVRO involvement is no different."

How has Johnson TV and Sound marketed TVRO hardware?

"We agree with Dave Fedric that our future is to build a strong dealer organization. To that end, we have been advertising in the Oklahoma regional edition of TV GUIDE. We run a full page advertisement, as often as once per month,



**BOB GREEN of Johnson's TV and Sound** 

listing our dealers. This helps us, and it helps the dealers. It is not unusual to have 800-900 telephone calls and letters following an advertisement, in the first week or two. This has been our best source for locally generated sales leads, and it works! We now stock or try to stock between 30 and 35 complete terminals at all times."

What about the hardware?

"We love the X9 antenna and mount. We can now do a complete system installation in between 4 and 41/2 hours. We hold training seminars for our dealers, to keep them up to date on the latest equipment and techniques. What we learn ourselves, by doing it daily, and what we receive from National Microtech, gives us plenty of material to keep our affiliates current on this fast changing technology. We are going to be the satellite distributor for all of Oklahoma. That's our goal!"

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does not work!'. The rest is history.

"That's the story. Or the start of it, actually. We found we could do several things with a single piece 9 foot 4 inch antenna that we could not do with larger, panelized antennas. Because it is one piece, we get far better surface accuracy. So we picked up some of the gain that we may have lost, in theory, by doing a better job with the surface of a smaller antenna.

"Plus the X-9, as it became known, is cheaper to make. It was faster to put into production because you only need a single mold per antenna; not three or four. You make a master plug, and pull a mold a day rather than taking four days to make a mold for a sectionalized antenna. It was incredible the

difference it made; we were able to get to the marketplace with a huge quantity of product in a very short period of time. And for less money; \$895 to our distributors. It enabled us to build in a cost of promotion, national promotion, which gave us a new type of in-market product identity.

"Now we are selling something that really was different! The X-9, with the unusual shape, gives us a beautiful national product line identity. This is something we can focus on in our literature, and in our growing use of national media. Finally, it gave us something to promote which nobody else had available.

"Naturally there was resistance from people who couldn't see how we could trim four sides and stil have good pictures.



## SATELLITE DIGEST

CSD/2-82/41

But you see, for our marketing purposes, it did not have to work **better** than a regular antenna. **Only as good as....** And the rest has been the real history. It has gone like gang-busters; we are now past 1,000 per month manufactured, sold and shipped.

"Just for the record, we still manufacture the old style antennas as well; all the way up to 16 feet in size.

"We surveyed our distributors, last fall, about the things we do best, and worst. More than half of our distributors said the Apollo antenna was Apollo; next, mentioned by three distributors, was the STS receiver. That was incredible to us."

Now that you are turning out 1,000 or so of the Apollo series antennas, per month, using seven separate plants, what is the next step in antenna technology? Just keep adding more plants and more molds?

"No, there is more to it than that. There is a fair amount of sophisticated equipment available for an injection molded product. We have finally found what we want, I think. It appears that by moving to injection molding, we can take a lot of production bucks out of the antenna without giving up any of the performance or cosmetics in the process. The Apollo antennas are too successful a product to take a step backwards. If everything works out as planned, by the summer of '82, we will be in production and have in-house capability to turn out at least 2,000 antennas per month. Right here, in one spot."

There must be a break over point where the established multi-mold technique is no longer as cost efficient as moving ahead to the more sophisticated injection molding technology. Where is that point?

Well, we forecast the need by mid-summer of '82 to have available at least 2,000 of the Apollo antennas per month. It happens to be very close to the point where it becomes economical to go to injection molding. This would not be a replacement for fabrication at other locations, using the familiar multi-mold technique. This is an entirely new way for us to build antennas, using injected fiberglass. This will simply add to our present capacity. The result is a lighter weight antenna that is actully stronger. The initial tooling and equipment costs are monstrous. But, after you get it rolling, the per piece price comes way down. That will make us more competitive than ever.

"This is quite a step forward for anyone in this field. It is a very sophisticated process. For the chemicals that you use, underground tanks are required. The tanks have to be heated and/or cooled, very carefully. And very precisely. All material handling is conveyorized, all material control by computer. This is all part of our new 45,000 square foot facility now being completed."

In all fairness, aren't we talking about an injected antenna technology which Prodelin pioneered some time ago?

"Yes, and no. How we will do it is not exactly how Prodelin now does it. We kind of had a choice. We could go to Prodelin and buy from them, or we could set up and do it ourselves.

"Let's face it; if those guys at MA/COM (owners of Prodelin) really wanted to address the private terminal market, nobody could compete with them. They have it all. A Canadian LNA plant, a Massachusetts receiver and microwave plant second to none, and their antenna plant in New Jersey. The wonder to me is that they have not jumped in with both feet. I can only assume they have not done so because somewhere they lack the ability to focus on a marketplace; this marketplace in this instance.

"They have the most efficient parabolic antenna manufacturing process in the world, today, for ten foot size dishes. With their existing tooling, they could run almost any number of complete TVRO antennas they want to run. Nobody could touch them if they decided to do it, today; not tomorrow. Now tomorrow, well, they're not getting into this field...tomorrow will be a different story.

"They have a good, first-class looking antenna, even though they have had problems with it. Back this past summer, they

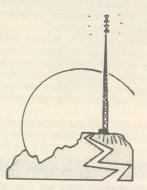
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had a lot of problems. But they resolved these problems. I'll tell you what they did; they told me they had a thousand of the antennas and they refused to sell them for any amount of money. They were all bad. They asked me what I thought they could do with them, other than sell them for use as microwave or TVRO antennas. What, really, can you do with a ten foot fiberglass or molded plastic bird bath? Not much!

"I have to hand it to Prodelin. With the integrity they have, they refused to sell them. Period. That says a lot for Prodelin."

If Prodelin had problems with their injected antennas, and you admit that one of the primary reasons you "discovered" the square Apollo antenna was the lack of the panel to panel integrity of panelized fiberglass antennas, it sounds to me as if antenna structural quality is not something we should be taking lightly. I've seen, at the Omaha antenna tests for example, plenty of proof that all ten-foots or all twelve-foots, or all any-size an-



## SATELLITE DIGEST-

tennas, are not created equal. Just how serious are these problems?

"Antenna integrity is the biggest bug-a-boo in the industry today. Quality control of fiberglass is the real problem. Now aluminum antennas are one thing. Jamie Gowan went through this with his (ADM) antennas, and got it cleaned up. With an aluminum or metal antenna, once you get the dies and rolls and machinery properly adjusted, so the pieces fit together when the antennas are assembled, it is fairly easy to turn the production loose. That is never true with fiberglass.

"Each batch of fiberglass antennas has its own unique properties. It is very difficult, when you are under pressure to ship 40 to 50 antennas each working day, for us or anyone else to do a complete and thorough analysis on each anten-

"They are constantly coming in to our facility, from the fabrication shops, and going out. They come in one day, and bang - the next day or two days later at the most, they are out the door and on the way to a distributor. There is a constant turn of products. All of this takes a great deal of coordination. Now you can look at each one for physical appearance, but what happens if something is wrong inside?

"I'll tell you what happens; they start to de-laminate. Now, we have used every kind of substance there is, suitable for fabrication. And they all have about the same characteristics. If the mixing and processing is not done just right, the

antenna starts to come apart.

"It all, really, gets back to human skills. They come in the door of their plants, and they look at where their production is at that moment. They have to get so many antennas out the door that day. And they start off the day by being behind. That creates a situation where everyone involved feels pressure, and it is human nature to push and take shortcuts to take up the slack.

"We have always told our fabricators "Don't tell us you can deliver X number of antennas unless you really can do it!". Well, they tell us anyhow, and we sell that many, and promise delivery for that many, and we are looking to them to have the antennas here on schedule. They feel the pressure, and then it happens.

"The truth is there is a world of difference between low production and high production of antennas. If we don't take this step at National Microtech, somebody else is going to do it for us. Prodelin is already doing it, although perhaps not with the marketing emphasis their resources would allow

them to pursue."

I heard Tom Humpheries tell an audience here at SVS '81 today 'we are all here to make money. This is a very exciting industry, and the excitement of a new technology naturally attracts many people. But the bottom line is that there is a tremendous opportunity here to make money'. You would appear to me to be close to the \$30,000,000 per year level in sales. You are moving lots of product. Is it fair to ask about your own profit structure?

"We work on around 7 percent. That is not much. In fact, it is less than the present annual rate of inflation, if that puts it into perspective. But you know, if you try to take too much out of something, at any step of the chain, all you wil do is encourage others with perhaps better resources to jump in there with you, or on top of you. On the other hand, if you are fair with your customers, you are building an organization that will be here as the industry grows. We don't see this as a one or two year proposition. We see it as a long term thing; we think the 4 gig-a-hertz service will be around a long, long time.

Let's talk about Low Noise Amplifiers (LNAs). You have to be the largest buyer of LNAs in the world today.

This month (November 1981) we are taking 1,000 LNAs from Amplica and 200 from MA/COM. Amplica is the guys we have kind of been in bed with; they have been honest and have treated us fairly, always.'

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## OOP'S SATELLITE DIGEST-

Amplica recently sold to COMSAT, the folks who own more than 25% of INTELSAT and the company that represents the US ownership position with INTELSAT. Have you had any feedback yet on that purchase, or rather sale, of Amplica?

"Fifty seven million dollars. That's what they sold for. I believe they did around eight million in 1980. Can you imagine taking in 8 million and selling for 57 million. Incred-

ible. What a business this is!"

Well, I doubt they sold for 57 million because of their present or recent-past earnings record. Is your posture with them going to change any, as a result of this

COMSAT acquisition?

"You know, COMSAT is in the 12 GHz race. That is their baby; they conceived the 12 GHz DBS birds and they were first to apply for licensing from the FCC. And I think that is why they took Amplica. I understand they (COMSAT) spent 40 million dollars on research and develoment in 1980 alone. That is a mind staggering number. Nobody in the world can afford to spend that kind of money unless the pot at the end of the rainbow is also mind staggering. If you have any doubts about the size of the game we are playing, that ought to erase your doubts."

Tell us about your LNA purchasing philosophy.

"We are on a standard 200 per week shipping schedule with Amplica. And we have the right to supplement that with 200 more per month, on 30 days notice. That's just over 1,000 LNAs per month. Then we went to MA/COM and placed an order for 1,000 units. We took 200 of these the first month.

"The MA/COM operation up in Canada was simply not doing that well, even though they were turning out a quality product. We wanted to make sure they would still be around, and that they would stay in the LNA business. We feel it is healthy to have a couple of good suppliers in the field and we are going to do our part to see that that takes place.

"It is my judgement that we have only three sources for

LNAs. That frightens me. There is Amplica, Avantek and MA/COM. I don't know about Dexcel. I know you like them, Bob."

I have felt good about the quality of their product,

certainly.

"Well, my posture is different than yours. Through CSD, you perform a service by looking at product quality from time to time. From our point of view, we want a product that works well, certainly, but of equal importance is the ability of the supplier to deliver a quantity of the item to us, on time, every month.

"With our Amplica LNAs, we run under 2% defects. It has been that way since we started with Amplica. Personally, I think all of the LNAs, of the same noise temperature, are pretty much the same. I don't think the average dealer can tell the difference between brands; I am sure the customer cannot tell the difference.

"We get full data sheets with **each** Amplica. And that's for every single unit we receive. Each LNA is checked across the full band, not just in a couple of spots, at 23 to 24 degrees C. At one time the LNAs we were getting had "batch data sheets", covering the average of all of the LNAs shipped. That wasn't good; we didn't want that.

"We love Amplica. They are on time. And no matter what happens to a unit, they repair it for one year. Even if the LNA is

struck directly by lightning, they repair it.

"And this is an excellent policy, because unless you are standing right there when it quits, you have no real way of knowing what really happened. The only common sense way to handle LNA repairs is for the OEM to simply say "No matter what happens, we'll fix it". Amplica does that for us."

If I recall, you started out using Avantek LNAs. Now you are using Amplica and MA/COM. Is there a story here?

"Well, let me tell you another story. Avantek has over 200,000 square feet of production space. They are great people with a tremendous grasp of the technology. We did

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business with them early, and they had a jump on the rest; including Amplica. Unfortunately, in that 200,000 square feet they have so much going on, so many different products and so many different areas of interest, they have lost track of what I call "focus". To us, focusing on small TVROs; that is where the action is.

"Amplica, on the other hand, recently expanded and they now have around 40,000 square feet of space. They are focusing on what we need most from them; high quality LNAs. reasonably priced, with on time delivery. Focusing? That is the secret to this business, at every level."

Focusing. That's a good descriptive word. You are now buying LNAs from MA/COM. What do you think of this company?

"Now MA/COM is the kind of company I have to look at carefully. Yes, we are buying a couple of hundred LNAs from them monthly now, through their Canadian division. When I placed the order with them, I kidded about waking up some morning and finding out they were competing directly with me. I suggested that they give me the kind of deal, for distribution, where I could market it all for them. I was suggesting that they wouldn't have to "fool around" with this marketplace.

"There are companies with the capability to really enter this market with both feet running. MA/COM is one of those. Scientific Atlanta, on the other hand, will never make an impact in this market. They are simply not going to leave any money on the table. They have always been top dollar, and top-dollar-profit, oriented. And more important, they practically build to order. I don't see how you can feed a distribution organization by building to order, unless the distributors are willing to carry the cost of inventory for the products. And that is not going to happen in this industry; soon.

"S/A lead time is probably going to stay long for a long-long time. They just won't play in the consumer market. And even though they are now working with Heath and Zenith, I don't see them changing their philosophy for this marketplace. They just think differently than we do."

What about the S/A-Heath-Zenith entry into the market? In our view this is small volume, probably not to exceed 100 systems per month in the current year.

"I agree. They are after a small nitch in the market, probably to allow Zenith to gain some practical experience in this field. Their market is the Heath market, which is the electronic hobbiest. We won't touch that market. We feel the hobbiest knows more about terminals than we do, and he is never satisfied in his quest to learn more. They want to spend hours asking questions, and they want plenty of custom consideration. We are simply not geared to handle them; we are a volume based business. We can't supply a part of a receiver, or a down converter stand alone, to a fellow because he built the rest already. That is a strange, funny, and little market. I wish them well with it."

#### **Next Month** -

The concluding part of this series of interviews with National Microtech's Dave Fedric.

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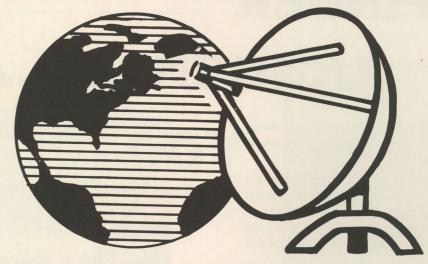


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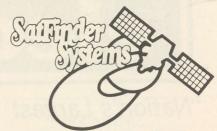
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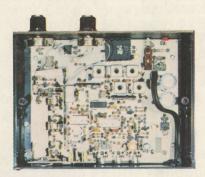
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